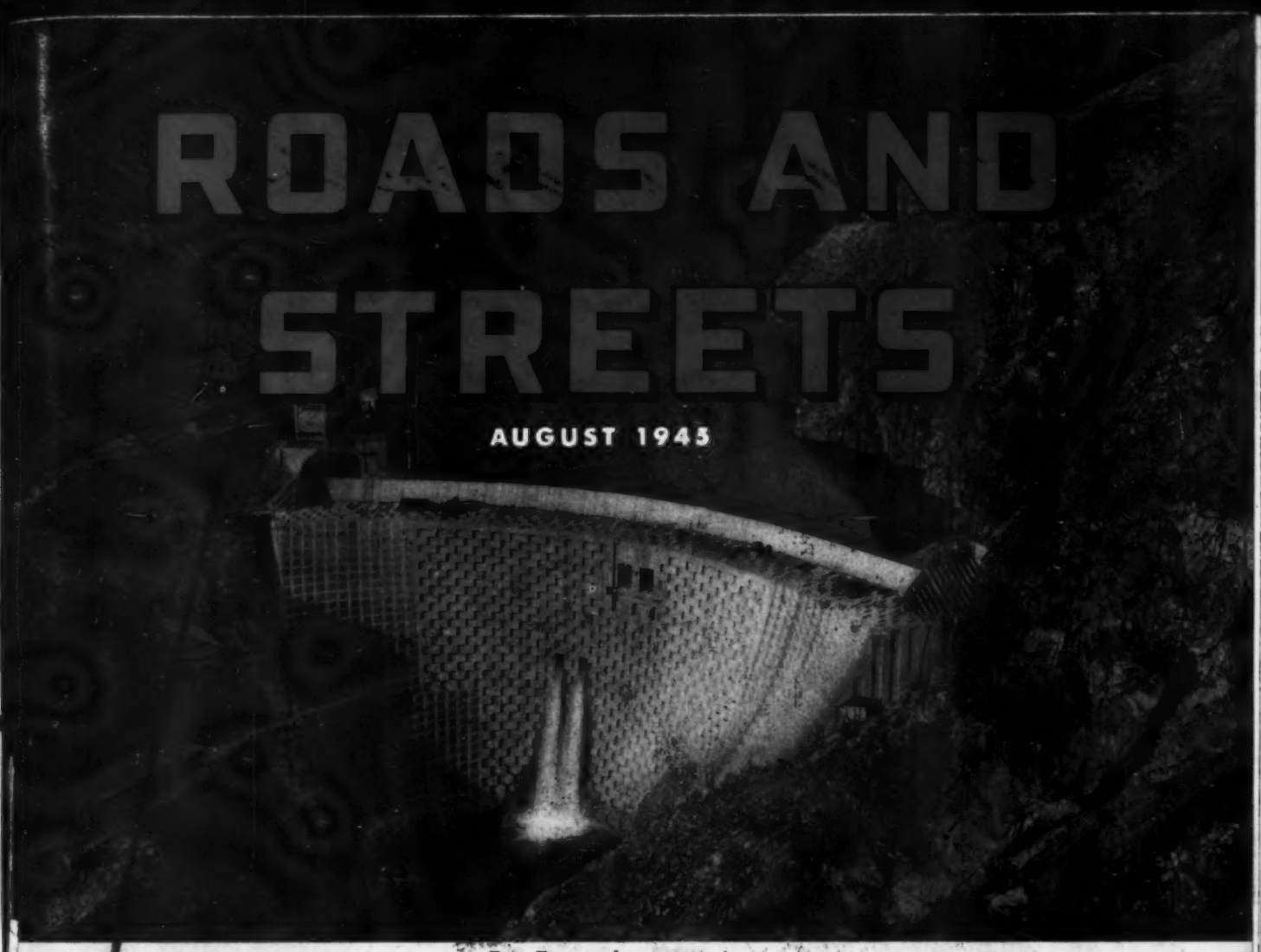
ROADS AND STREETS

AUGUST 1945



Ross Dam under construction.

TIMKEN ROCK BITS nip drilling costs at Ross Dam

Timken Rock Bits are being used 100% in the construction of the second step (185 feet) of Ross Dam.

Ross Dam is being built by a leading northwest contracting firm for the City of Seattle. It is part of that city's great hydro-electric power project and is located on the Skagit River in northern Washington.

The dam is being constructed in three stages or steps. The first step (290 feet) was completed in 1940. The second step (185 feet) should be completed in 1946. The third step (100 feet) will finish the job.

Transportation is one of the heaviest items of rock drilling cost on this project, but Timken Rock Bits have effected gratifying savings for the contractor by consistently reducing transportation and nipping costs and cutting drilling time.

This contractor—and scores of others—have proved it pays and pays well to use Timken Bits. Are *you* using them? The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

ROCK BITS

Easily Operated in the Roughest Going!

Yes, Adams Motor Graders are engineered for fast, easy operation—even in the roughest kind of going. Here are just a few salient features:

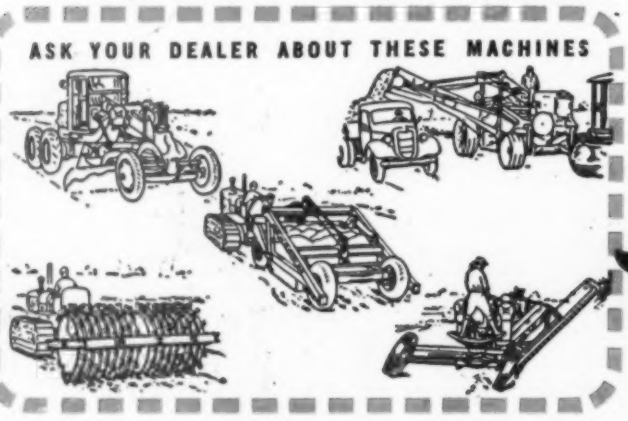
● **Efficient Push-Button Starting Arrangement:** Starts heavy-duty Diesel engine quickly, easily—regardless of weather or temperature—right from the cab.

● **Big, Comfortable Cab:** Wide, adjustable seat—Plenty of room for stand-up or sit-down operation—All operating controls within easy reach.

● **Positive Mechanical Steering System:** Mounted throughout on anti-friction bearings—Provides easy steering with *safe control* under all conditions—*at all speeds.*

Ease of operation is just one more reason why rugged, multiple-duty Adams Motor Graders are the wise choice for high-speed efficiency and economy. Ask your local Adams dealer for convincing proof.

ASK YOUR DEALER ABOUT THESE MACHINES



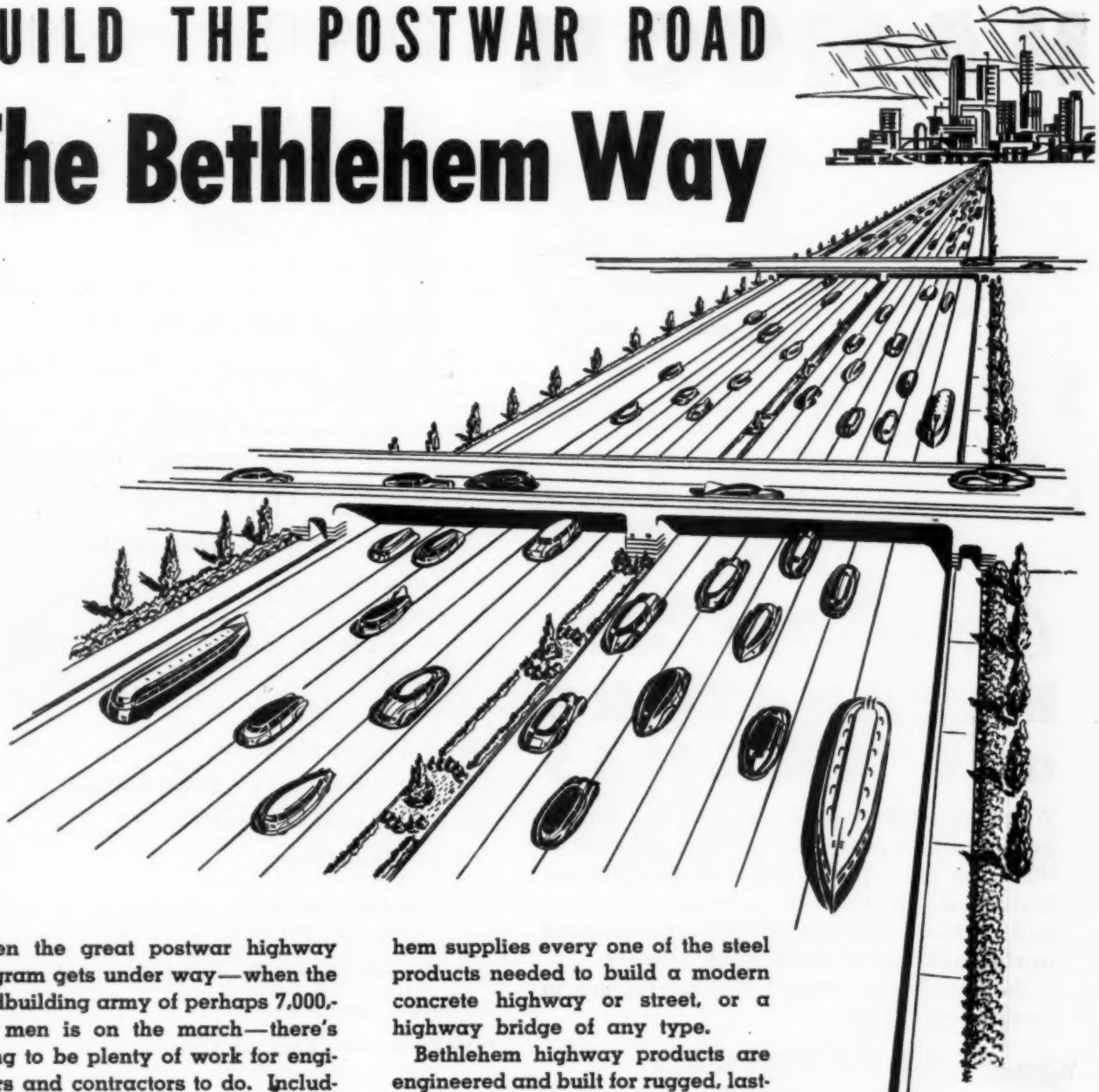
J. D. ADAMS MANUFACTURING CO.
INDIANAPOLIS, INDIANA
Sales and Service Throughout the World

Adams

ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

BUILD THE POSTWAR ROAD

The Bethlehem Way



When the great postwar highway program gets under way—when the roadbuilding army of perhaps 7,000,000 men is on the march—there's going to be plenty of work for engineers and contractors to do. Including lots of paper work.

Why not lighten your paper burden by planning to order all your steel needs for a road job from Bethlehem? A telephone call to a nearby Bethlehem district office or warehouse is all that's necessary to get a complete road-steel order co-ordinated and moving fast. And Bethlehem supplies every one of the steel products needed to build a modern concrete highway or street, or a highway bridge of any type.

Bethlehem highway products are engineered and built for rugged, lasting service. They'll carry you along the road job, from the time the Bethlehem hollow drill bites into solid rock until the last section of guard rail is in place.

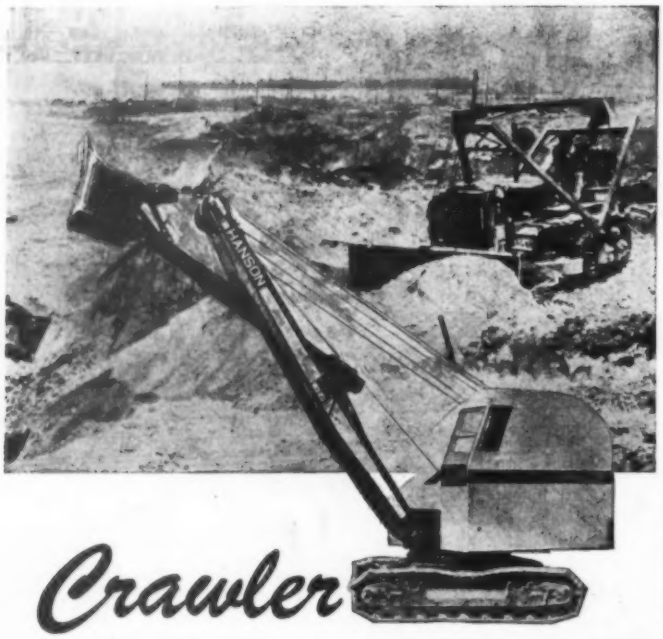
For full information, get in touch with the nearest Bethlehem district office, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM PRODUCTS FOR HIGHWAYS

ROAD JOINTS DOWELS DOWEL BAR SUPPORTS CENTER STRIP
WIRE ROPE AND STRAND BAR MATS BAR TIES
BEAM AND CABLE-TYPE GUARD RAILS HIGHWAY GUARD POSTS AND BRACKETS
ANCHOR RODS RIGHT-OF-WAY FENCE AND POSTS PIPE HOLLOW DRILL STEEL
DIGGING BARS STRUCTURAL STEEL MOLD BOARDS BRIDGE FLOOR REINFORCING
CORRUGATED SHEETS CONCRETE SLAB SPACERS TURNBUCKLES
TIE RODS, SPIKES, BOLTS AND NUTS TIMBER BRIDGE HARDWARE
SHEET AND H-BEARING PILING

BETHLEHEM STEEL

HANSON



Crawler

EXCAVATORS and CRANES

With Hanson Crawler Excavators and Cranes you can hoist, propel, swing and steer, all at the same time. This is the exclusive Hanson feature which enables so many engineers and contractors to add that extra bit of speed *and profit* that makes the job pay out.

Put this "extra profit" Hanson feature to work on your jobs.

EXCAVATORS

3/8 and 1/2 Cu. Yd. Capacity
Full revolving — Chain crowd —
Welded steel construction — Low center of gravity.
Gasoline or diesel.

CRANES

4 and 6 Ton Capacity
Full revolving — Lattice type steel boom —
Balanced design — Low center of gravity —
Rugged — Versatile — Gasoline or diesel

CONVERTIBLE TO:

Shovel — Crane — Dragline — Pile Driver — Clamshell — Trench Hoe

Complete details in folder EC45. Write for it.

THE HANSON CLUTCH & MACHINERY CO.
TIFFIN, OHIO

ROADS AND STREETS

Vol. 88, No. 8 — August, 1945

ECA

A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations, and to the construction and maintenance of airports.

WITH ROADS AND STREETS HAVE BEEN COMBINED GOOD ROADS MAGAZINE AND ENGINEERING & CONTRACTING

HALBERT P. GILLETTE, President; EDWARD S. GILLETTE, Publisher; HAROLD J. McKEEVER, Editor; CHARLES T. MURRAY, Managing Editor; JOHN C. BLACK, Field Editor; LT. COL. V. J. BROWN, Publishing Director (Absent on Military Duty); H. J. CONWAY, Advertising Editor; L. R. VICKERS, Promotional Director.

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YOU'LL GET *MORE* OUT OF A *MULTI-PURPOSE* LORAIN!

CAREFUL job analysis shows that the vast majority of construction operations can be broken down into the seven basic work classifications shown below. Since no one can tell exactly which of these types of work—or combinations of them—your present or next contract will bring, the wisest investment is in equipment that can be adapted to every kind of work. And no other machines will fit into any and all classifications as well as multi-purpose Lorain Cranes and Shovels!

When you plan your next equipment purchase, look beyond the immediate job—consider the long range possibilities of what you buy. In stamina, in basic engineering and adaptability to every kind of work, Lorain Cranes and Shovels are designed to give you *years* of service on *all kinds* of jobs.

The five convertible and interchangeable front-ends shown actually give you five machines in one—an all-purpose outfit ready to cover the entire range of excavating, material handling and building jobs.

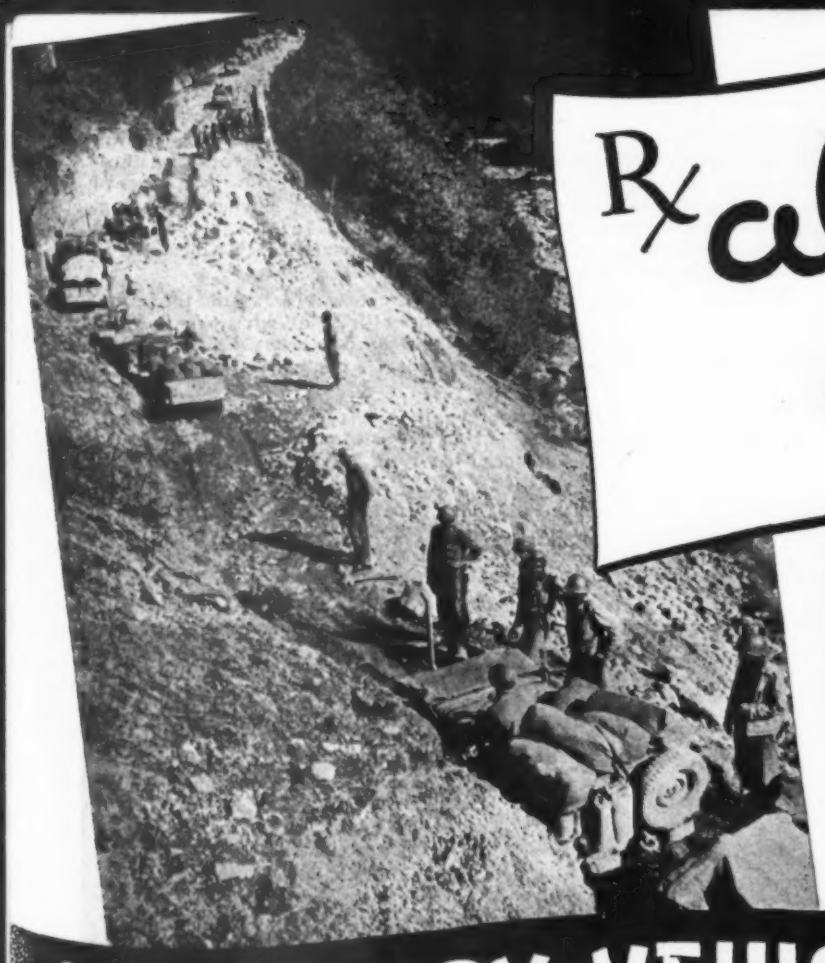
Ask your nearest Lorain distributor—or write us direct —for the facts and figures. Among the large and small crawler-mounted Lorains, rubber-tired Lorain Moto-Cranes and rubber-tired Self-Propelled cranes there's the right machine for your conditions. Let us help you pick the right one now for many future years of profitable service.

You can do all these jobs with one machine —A LORAIN!
DEEP EXCAVATIONS
WET BOTTOM JOBS
BANK, CUTS and SLOPES
CASTING
MATERIAL HANDLING
ROCK WORK
LIFTING SERVICE
Easily and quickly convertible to dragline, clamshell, shovel, backdigger or crane work, one Lorain will give you the same work range as several special purpose machines! Available on crawler or rubber-tired mountings.

Reg. Trade Mark

thew-Lorain

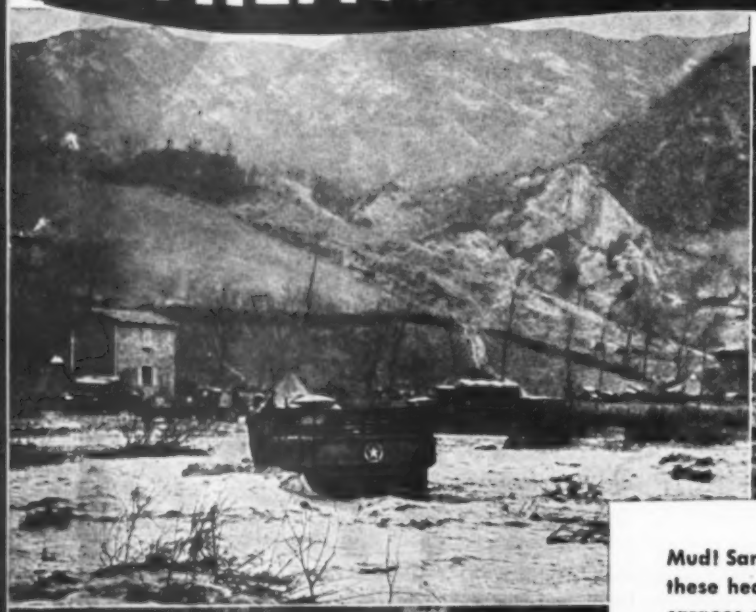
CRANES • SHOVELS • DRAGLINES • MOTO-CRANES



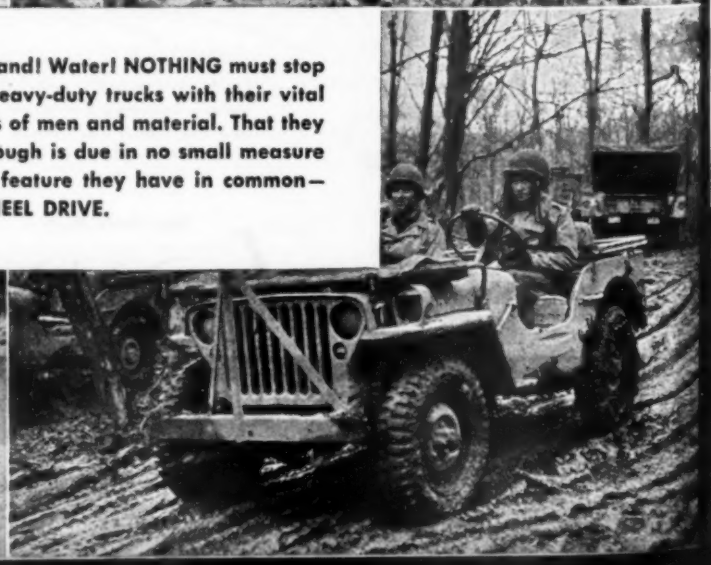
Rx all-wheel drive

Maximum Effort .

in MILITARY VEHICLES



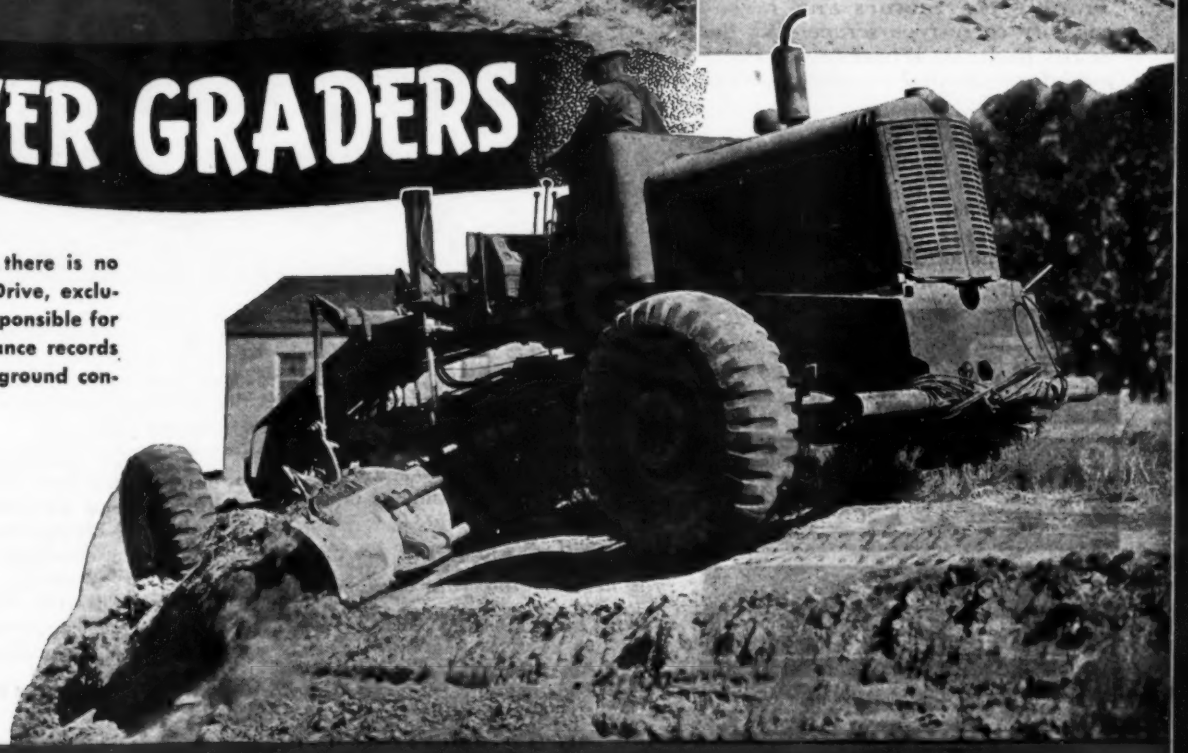
Mud! Sand! Water! NOTHING must stop these heavy-duty trucks with their vital cargoes of men and material. That they get through is due in no small measure to one feature they have in common—ALL-WHEEL DRIVE.



for Tractive . . . .

in POWER GRADERS

In Power Graders, too, there is no substitute for All-Whel Drive, exclusive in the 99-M, and responsible for its outstanding performance records under the most difficult ground conditions.



BUILDERS OF ROAD MACHINERY

Austin-Western

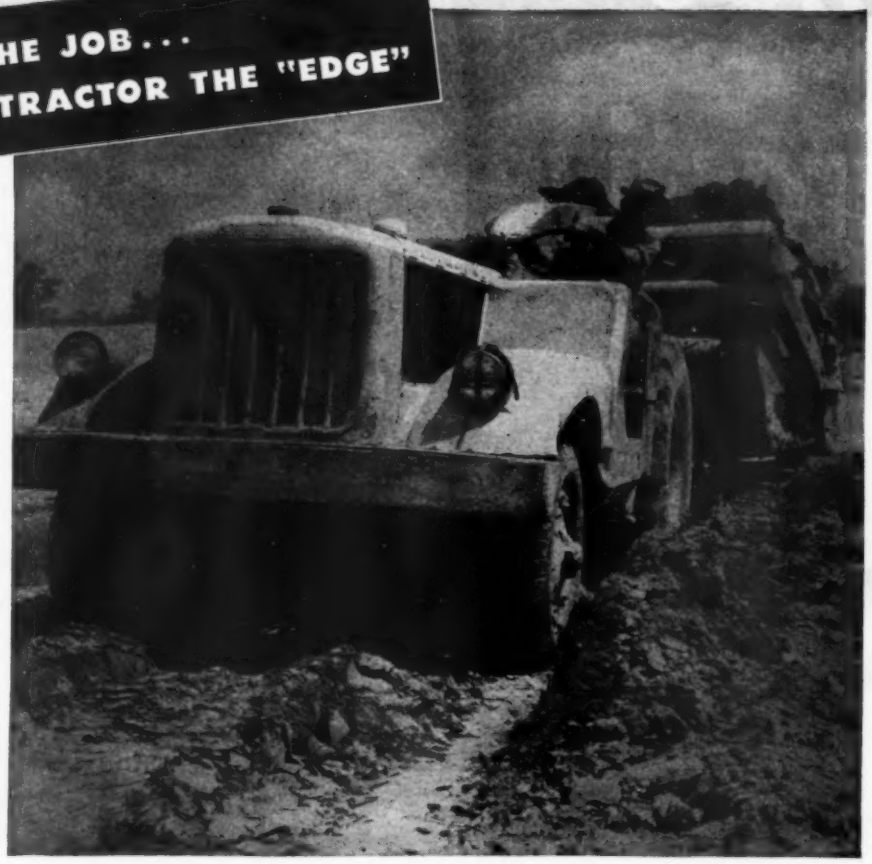
SINCE 1859

BUY MORE WAR BONDS

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

Zoned Equipment

SPEEDED THE JOB . . . GAVE CONTRACTOR THE "EDGE"



IT WAS a hurry-up job, and Winkelman* did it! . . . because it was organized with equipment thoughtfully "zoned" according to the sphere for which each unit was best suited. That's how the moving of 2½ million yards of earth for the Natchez Airport was accomplished quickly and at low cost.

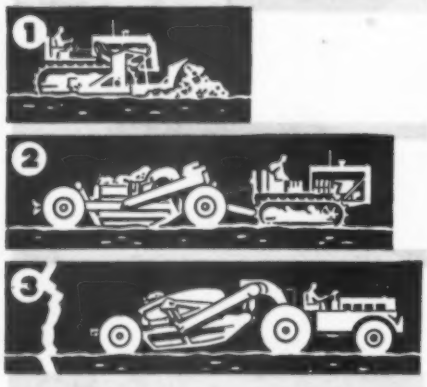
Cuts ranged up to 25 feet; fills to 44 feet; hauling distances to 1800 feet. For fastest and most economical operation, all three modern methods were used: (1) *Track-type tractors and bulldozers* for the "pushaways"; (2) *Track-type tractors and large-capacity carry-type scrapers* for the shorter hauls; (3) *Wheel tractors and pushdozer-loaded scrapers* for the distance hauls.

23 out of the 24 track-type tractors used were "Caterpillar" Diesels.

All 11 of the wheel tractors were "Caterpillar" Diesel DW10's

The 7 motor graders used were "Caterpillar" Diesels.

*D. W. Winkelman Co., Inc., contractor. Illustration shows only a small portion of equipment used on project.



Wagons, bulldozers, rollers, scarifiers, distributors, mixers and minor pieces completed the well-rounded equipment for handling this and similar large-scale projects with efficiency—and with minimum risk of underestimates or delays.

"Caterpillar" builds the power units you need to zone your equipment for

LOWEST COSTS ON EARTH

There are "Caterpillar" Diesel track-type tractors, wheel tractors, motor graders and engines—all in the right models or sizes for a wide range of earthmoving jobs.

Thus, the contractor who "goes one hundred per cent 'Caterpillar'" gives himself the further advantage of having all his equipment kept in good serviceable condition by *one* service-dealer organization. It is a *nation-wide* organization—the most complete, conveniently spotted and efficiently equipped of its kind in the world.

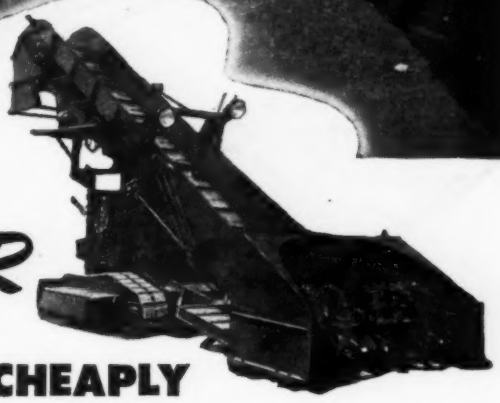
CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

The discharged veteran wears this emblem. Remember his service and honor him.



HOW A B-G SNOW LOADER

CLEARS STREETS SPEEDILY AND CHEAPLY

This Barber-Greene machine doesn't just push snow from one place to another—it *removes* the snow from your streets *completely*. And, you can clear thoroughfares quicker and more economically with the B-G Snow Loader than any other way.

Actually, a B-G Snow Loader often pays for itself in a single operation—*in truck time savings alone*. In addition, it will replace scores of hand shovelers by loading up to 20 cubic yards of windrowed snow a minute, hour after hour.

There's no need to pamper a B-G Snow Loader. Full crawler mounting makes it sure-footed on the slipperiest streets. Notched spirals eat through icy chunks and packed banks easily. An Automatic Overload Release protects the loading mechanism when hidden obstacles are encountered.

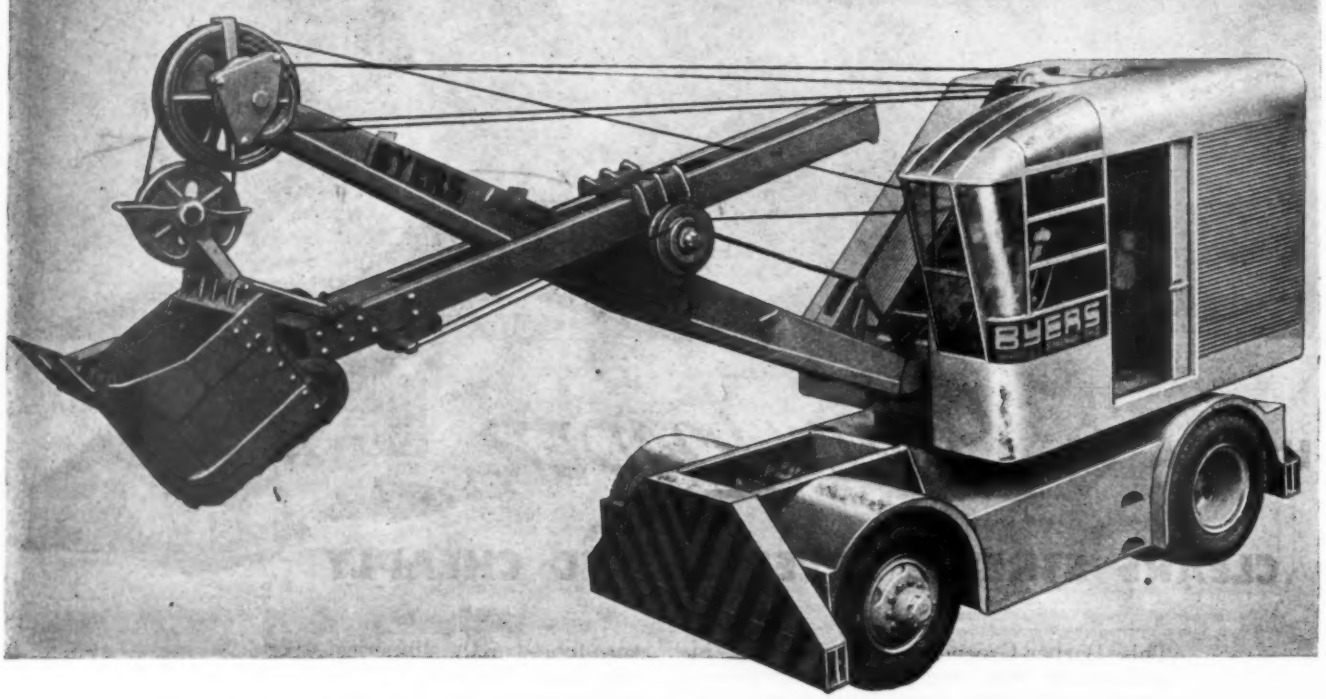
B-G Snow Loaders have many other advantages too: high discharge for high-sided trucks, variable crowding speed, floating boom, tank-type chassis, low traveling clearance, easy operation. Best of all, by merely replacing the boom, it can be converted into a B-G Bucket Loader for year round utility in material handling jobs. Barber-Greene Company, Aurora, Illinois.

45-13

Barber-Greene B G *Constant Flow Equipment*

ONLY ONE OPERATOR ON BYERS TRUCK TYPE "TRAVELER"

HERE'S HOW YOUR NEW 1/2-YARD SHOVEL WILL LOOK . . .



HERE is a power shovel and crane with new, wide range Mobility because it is built on its own rubber tired all wheel drive "truck".

This rubber-tired chassis was specially engineered to provide a short coupled under-carriage that permits full circle shovel operation.

Thus, it is the first and foremost shovel that combines truck mobility *without sacrificing full circle 360° operating advantages.*

In addition, it is entirely operated by *one man,* who completely and easily controls all operations of traveling and operating. *No longer is it necessary for truck type excavators to have separate drivers and operators.*

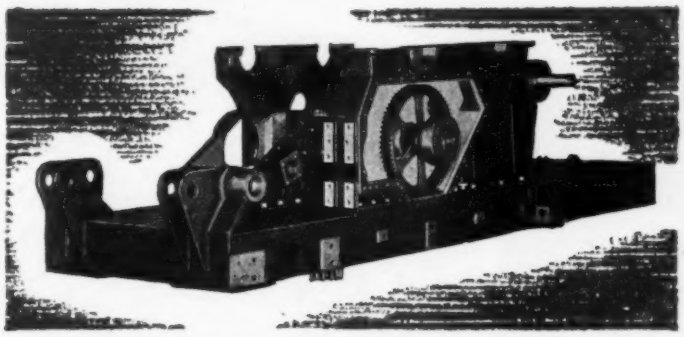
Byers "Traveler" is: first, a fast, smooth operating, powerful excavator with new economy features every shovel runner has wanted. It is: second, a self-propeller truck-type excavator that gets around as readily on the job as a truck and which travels at adequate truck speeds on the highway. It is: third, a tested, proved and approved unit for half-yard shovel jobs or ten ton crane jobs which contractors will be needing to meet today's competition for work.

If this is the type of excavator or crane you'd like to have, inquire for further details today.

TOMORROW'S SHOVEL IS HERE TODAY

OUTSTANDING FEATURES OF BYERS *HALF-YARD* TRAVELER

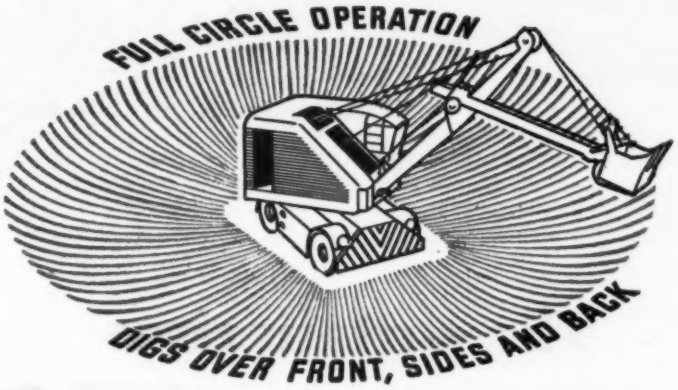
1. **Self Propelled** . . . around the job or on the highway.
   ELIMINATES TRAILER
2. **One man operated** . . . All controls conveniently grouped for operating or steering by the operator.
   ELIMINATES SECOND MAN
3. **4-wheel drive** . . . 6 wheel traction, mud grip
   SPECIALLY ENGINEERED CHASSIS
4. **Digs all around** . . . Over front, sides, back.
   A FULL CIRCLE MACHINE
5. **Air controls, hydraulic brakes.** Power steer.
   NOT AN "OLD" DESIGN MODERNIZED
6. **New, smooth "Airflex" cool internal expanding clutches.**
   FREE FROM ADJUSTMENT AND REPAIR
7. **Enclosed gears running in flowing oil.**
   EFFICIENT, CLEAN, LONG LIVED



BUILT LIKE A BATTLESHIP —STURDY FRAMES

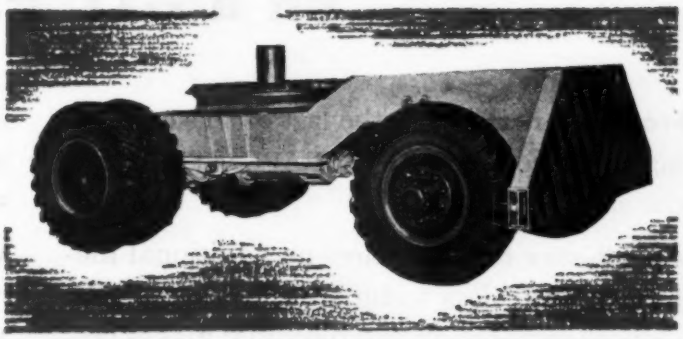
Because the chassis frame and main revolving frame of Byers "Traveler" was specially engineered for this particular excavator, the owner is assured of strong, rigid warp-proof construction. Capable of resisting twists and strains incident to traveling over rough ground, and shock loads of heavy digging, the "Traveler" combines maximum strength with minimum weight.

Basic construction of the "Traveler" has been proved rugged and dependable in actual service.



NEW SHOVELS AND CRANES WILL HAVE NEW, WIDE RANGE *MOBILITY*

because they will be built over a specially designed chassis like this . . . which overcome crawler handicaps and permits them to travel on the highway at adequate truck speeds.



BYERS *HALF YARD* TRAVELER

THE BYERS MACHINE COMPANY • RAVENNA, OHIO

Distributors Throughout The World

WRITE FOR THIS FREE ILLUSTRATED BOOKLET TODAY

The curtain rises on a HIT PERFORMANCE...

From the first act to the last of this cementing operation, ATLAS DURAPLASTIC steals the show!

An all-star bill—requires no additional materials; needs less water for a workable mix; reduces segregation and bleeding; makes better concrete at no extra cost!

Takes the chill off any audience — fortifies the concrete against freezing and thawing weather! Has the hide of a seasoned trouper—resists scaling action due to use of de-icing salts!

Wins the praise of critics—makes concrete more durable, therefore is in for a record run!

For further information, write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

OFFICES: New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Cleveland, St. Louis, Minneapolis, Duluth, Kansas City, Des Moines, Birmingham, Waco.

RS-D-17

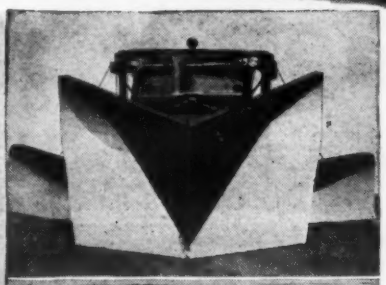
ATLAS DURAPLASTIC

TRADE MARK REG. U. A. C. CO.

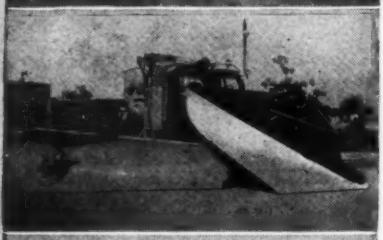
The Air-Entraining Portland Cement That Makes Concrete More Durable and More Plastic

WALTER 4-Point Positive Drive SNOW FIGHTERS

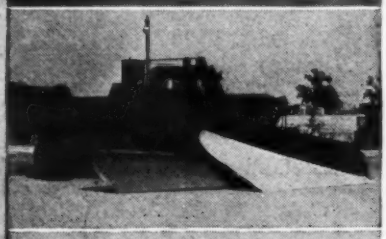
CLEAR MORE SNOW PER HOUR AT LOWER COST!



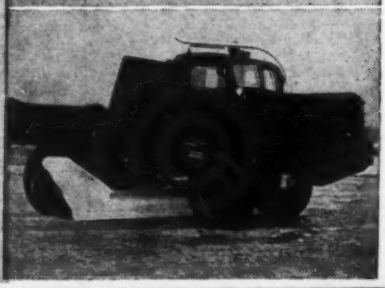
Walter 250 H.P. Snow Fighter, equipped with Front V-Plow and right and left speed wings, clears a two-lane road in one round trip.



Walter 185 H.P. Snow Fighter, equipped with Offset V-Plow and Rote-Wing to handle heavy, drifting snow.



Walter 150 H.P. Snow Fighter equipped with One-Way Speed Plow and Levelling Wing for general snow conditions.



Walter Snow Fighter, with Pressure Center Scraper attachment, peels hard-packed snow and ice from pavement—fast and efficiently — without damage to scraper, truck or road surface.

Walter Snow Fighters are specifically designed and constructed for one, tough job—SNOW REMOVAL. Tremendous power-plus-traction supplied by the exclusive Walter Four-Point Positive Drive enables them to maintain speeds up to 30 m.p.h., clear widths up to 28 ft. on one run. Road-blocking drifts are speedily opened. Snow is removed before it packs and freezes into dangerous ruts. Main highways are completely widened-out. More miles of secondary roads are cleared.

Remarkable volume of snow removed per hour cuts costs by reducing the number of trucks needed to cover your routes. Fewer trucks to service means lower operating expenditures—takes a big load off garage facilities normally strained by winter breakdowns. Over a quarter-century of engineering for snow removal stands behind Walter Snow Fighters. Write today for literature describing their many exclusive features in detail.

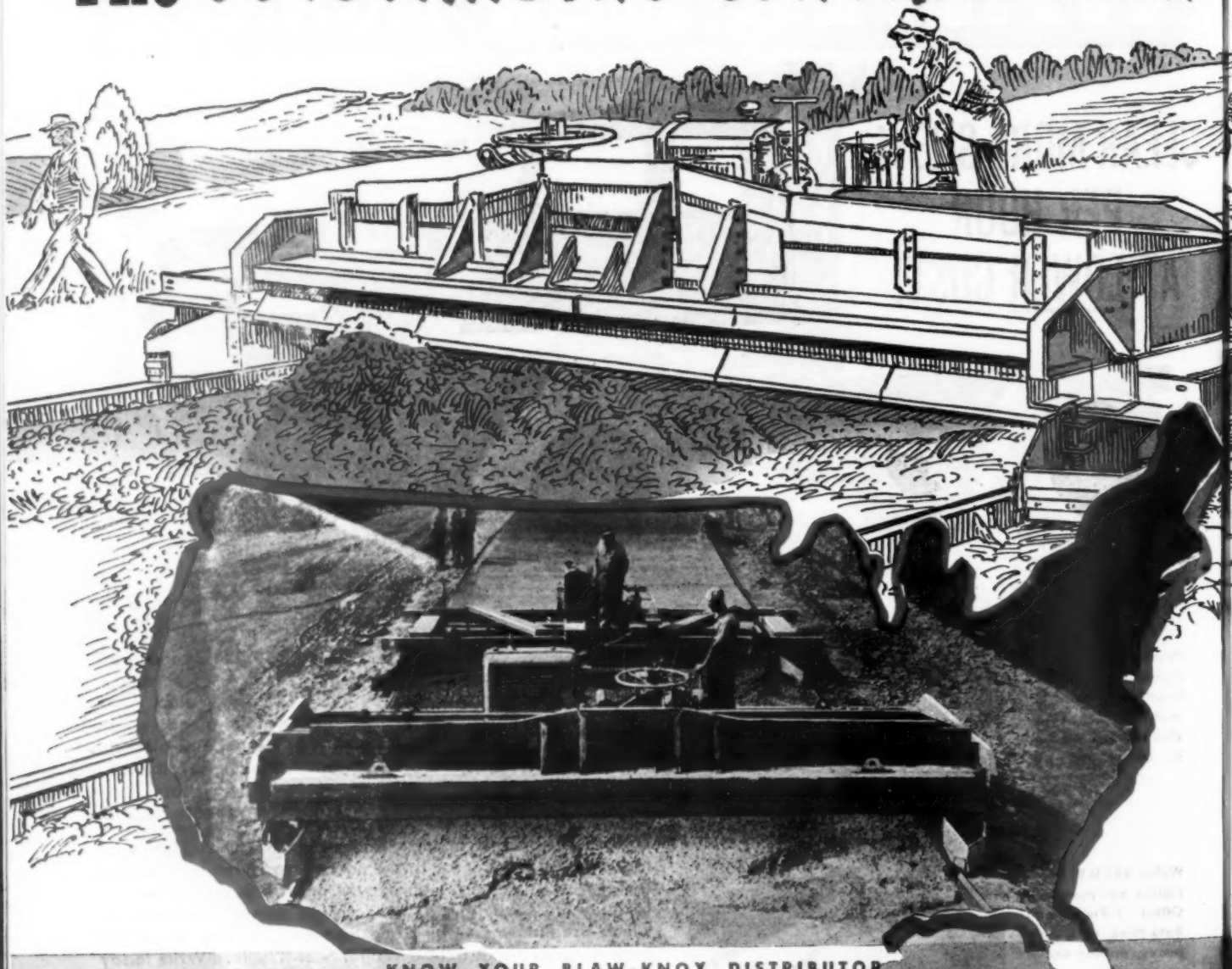
WALTER 4-POINT POSITIVE DRIVE PROVIDES 100% TRACTION

This unique drive system uses three automatic locking differentials to proportion power to FOUR driving wheels, according to their traction at any instant. Should one, two—even three—wheels lose traction, the mates carry on. There is no slipping, no wheel-spinning, no stalling or bogging-down because power is sent only where it can best be used.

Additional features of the Walter Four-Point Positive Drive System include Suspended Double Reduction Drive for higher ground clearance, less unsprung weight, larger gear capacity, better protection of parts; tractor type transmission for extra power and ruggedness; cab-forward design for scientific weight distribution; oversize gasoline or diesel motors (125 h.p. to 300 h.p.) develop full power at moderate engine speeds.

WALTER MOTOR TRUCK COMPANY, 1001-19 Irving Ave., Ridgewood 27, Queens, L. I., N. Y.

The OUTSTANDING CONTRIBUTION



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Washington — Matt A. Doetsch Mach. Co.

FLORIDA
Jacksonville — Florida Equipment Co.
Miami — Florida Equipment Company
Tampa — Epperson & Company

GEORGIA
Atlanta — W. C. Coye & Company

IDAHO
Boise — Intermountain Equip. Co.

ILLINOIS
Chicago — O. T. Christerson Co.
St. Louis, Mo. — O. B. Avery Company

INDIANA
Indianapolis — Reid-Holcomb Co.
Chicago, Ill. — O. T. Christerson Co.
Louisville, Ky. — Brandeis Mach. & Supply Co.

IOWA
Davenport — Gloeke-Robinson Co.
Des Moines — Herman H. Brown Co.

KANSAS
Kansas City — G. W. Van Keppel Co.

KENTUCKY
Louisville — Brandeis Mach. & Supply Co.

LOUISIANA
New Orleans — Southern States Equip. Co.

MAINE
Portland — Stanley-Cadigan Company

MARYLAND
Baltimore — Henry H. Meyer Co., Inc.

MASSACHUSETTS
Boston — The Equipment Company
New Haven, Conn. — W. I. Clark Co.

MICHIGAN
Detroit — Wm. P. Favorite Company
Grand Rapids — Contractors Mach. Co.
Iron Mountain — Service & Supply
Division of Lakeshore Engineering Co.

MINNESOTA
Duluth — Borchert-Ingersoll, Inc.
St. Paul — Borchert-Ingersoll, Inc.

MISSISSIPPI
Amory — Dalrymple Equip. Co.
New Orleans, La. — Southern States Equip. Co.

MISSOURI
Kansas City — G. W. Van Keppel Co.
St. Louis — O. B. Avery Company

MONTANA
Billings — Western Const. Equip. Co.

NEBRASKA
Omaha — Anderson Equipment Co.

NEVADA
Los Angeles, Cal. — E. M. Ornitz
San Francisco, Cal. — C. H. Grant Co.

NEW HAMPSHIRE
Barre, Vt. — Cassellini-Venable Corp.
Boston, Mass. — The Equipment Co.
Portland, Me. — Stanley-Cadigan Co.

NEW JERSEY
New York, N. Y. — R. E. Brooks Company
Philadelphia, Pa. — Giles & Ransome

NEW MEXICO
Albuquerque — Lively Equipment Co.

NEW YORK
Albany — Larkin Equipment Co.
Buffalo — Trevor Corporation
Elmira — LeValley, McLeod & Kinkeid
Endicott — Newing Motors Co., Inc.
New York — R. E. Brooks Company
Rochester — Keystone Builders Supply
Syracuse — Syracuse Lumber Co.
Utica — McQuade & Bannigan, Inc.

NORTH CAROLINA
Raleigh — Carolina Tractor & Equip. Co.
Salisbury — Carolina Tractor & Equip. Co.

OHIO
Cincinnati — Rish Equipment Co.
Cleveland — H. B. Fuller Equipment Co.

OKLAHOMA
Oklahoma City — Leland Equipment Co.
Tulsa — Leland Equipment Co.

OREGON
Portland — Contractors Equipment Corp.

PENNSYLVANIA
Philadelphia — Giles & Ransome
Pittsburgh — Dravo-Doyle Company

RHODE ISLAND
Boston, Mass. — The Equipment Co.

SOUTH CAROLINA
Columbia — Jeff Hunt Road Machinery Co.

SOUTH DAKOTA
Rapid City — I. D. Evans Equip. Co.

TENNESSEE
Chattanooga — Mizon-Hasselle Co.
Knoxville — Wilson-Weesner-Wilkinson Co.
Nashville — Wilson-Weesner-Wilkinson Co.
Memphis — Road Bldrs. Equip. Co.

TEXAS
Dallas — Conley-Lott-Nichols Mach. Co.
Houston — R. B. Everett & Co.
San Antonio — Acme Wire and Iron Co.

UTAH
Salt Lake City — C. H. Jones Co.

VERMONT
Barre — Cassellini-Venable Corp.

VIRGINIA
Richmond — Rish Equipment Co.
Roanoke — Rish Equipment Co.

WASHINGTON
Seattle — Star Machinery Co.
Spokane — Intermountain Equip. Co.

WEST VIRGINIA
Charleston — Rish Equipment Co.
Clarksburg — Rish Equipment Co.

WISCONSIN
Milwaukee — Hunter Tractor & Mach. Co.

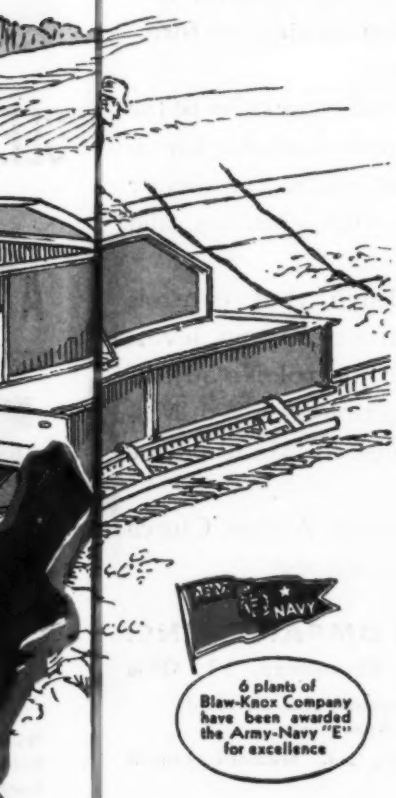
WYOMING
Billings, Mont. — Western Const. Equip. Co
Denver, Colo. — Ray Corson Mach. Co.

ALASKA
Seattle, Wash. — Northern Commercial Co.

CANADA
Montreal — Watson Jack & Co., Ltd.
Toronto — W. L. Ballentine Co.
Vancouver, B. C. — B. C. Equip. Co., Ltd.
Winnipeg — Kane Tractor & Equip. Co.
Saskatoon — Richardson Road Mach. Co.

NEW FOUNDLAND
St. Johns — Dominion Distributors Co.

ON to Paving Equipment in *25 Years*



6 plants of Blaw-Knox Company have been awarded the Army-Navy "E" for excellence

The Blaw-Knox CONCRETE SPREADER

Automatic Transverse Blade Type

FAST-EFFICIENT-ECONOMICAL

Here is the complete mechanical solution to the problem of spreading dry, harsh concrete mixes in large volumes at high speed. The Blaw-Knox Concrete Paving Spreader, first used on the Pennsylvania Turnpike in 1940, has proved itself indispensable to contractors for high production, low-cost paving work all over this country as well as abroad. It spreads concrete uniformly and accurately. With the pavement vibrator added, this one-man operated machine spreads and consolidates the concrete in a manner to satisfy the most exacting specifications.

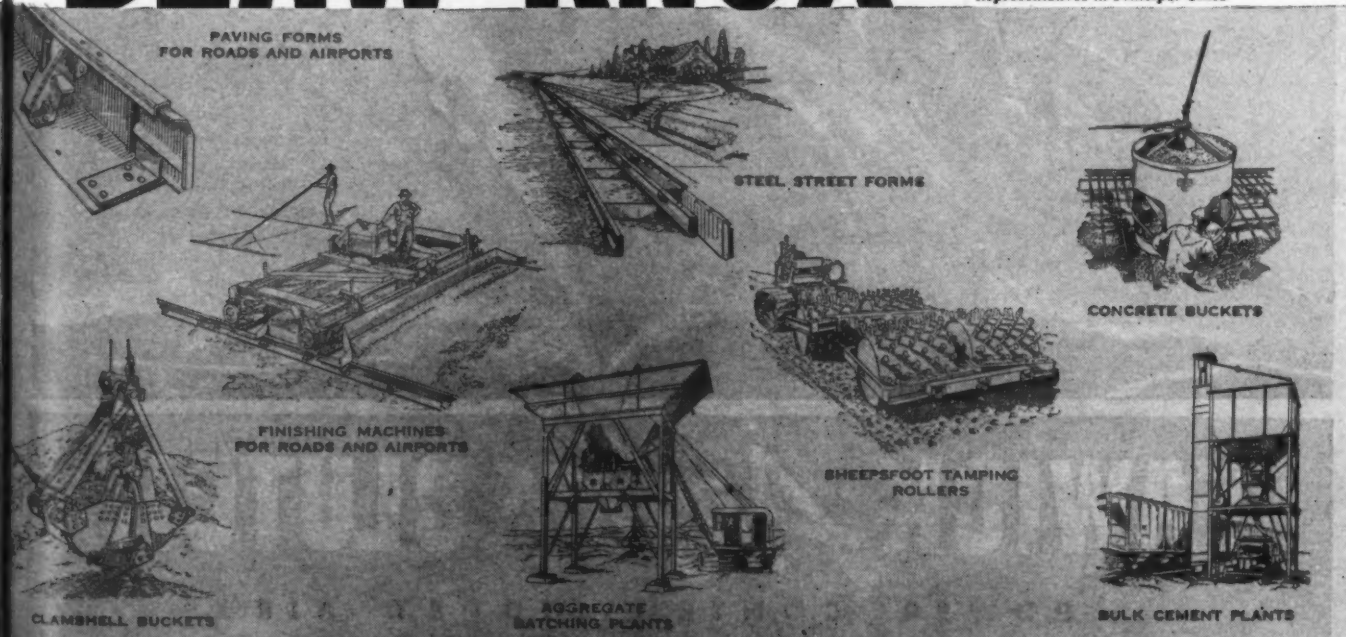
300 Linear Feet of 22 Foot Width Slab per Hour

And that's not exceptional performance for the Blaw-Knox Concrete Paving Spreader — it's normal. On airport or highway paving construction this machine will handle the maximum output of two dual drum 34-E Paving Mixers. A Blaw-Knox Finishing Machine is the perfect team-mate for the Blaw-Knox Concrete Paving Spreader.

Your nearest Blaw-Knox Dealer will handle your inquiries promptly.

BLAW-KNOX

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
0000 Farmers Bank Bldg., Pittsburgh, Pa.
NEW YORK • CHICAGO • PHILADELPHIA
BIRMINGHAM • WASHINGTON
Representatives in Principal Cities



A COMPLETE LINE OF CONSTRUCTION EQUIPMENT FOR CONCRETE PAVING OF ROADS, STREETS AND AIRPORTS, AND FOR GENERAL CONCRETE CONSTRUCTION.

WAR RECORD PROVES PERFORMANCE...FOR HEAVY-DUTY DRIVES

Thousands of Diesel-driven craft of many types have been equipped with Fawick Airflex Clutches. Without a single exception these ships are more effective, through greater maneuverability and more dependable performance under battle conditions.

The proved advantages and economies of the Fawick Airflex Clutch are now available for all industrial equipment that calls for heavy service clutches, brakes, slip clutches and power take-offs.

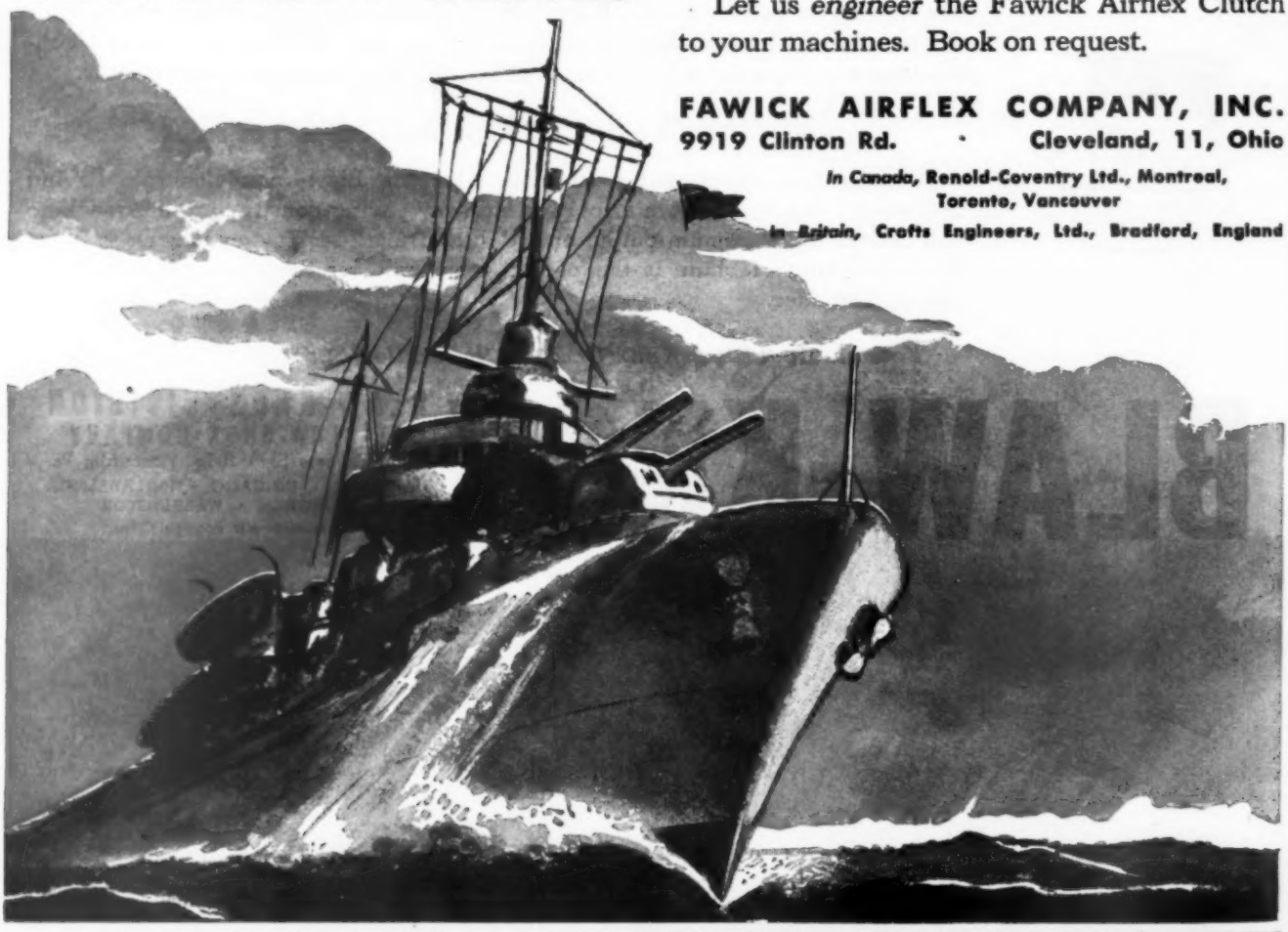
Airflex is the only clutch that controls torque by air pressure—without springs, levers or toggles. Direct or remote control. No adjustments to make—no lubrication required. Misalignment presents no problem. Maintenance costs unusually low.

Let us *engineer* the Fawick Airflex Clutch to your machines. Book on request.

FAWICK AIRFLEX COMPANY, INC.
9919 Clinton Rd. · Cleveland, 11, Ohio

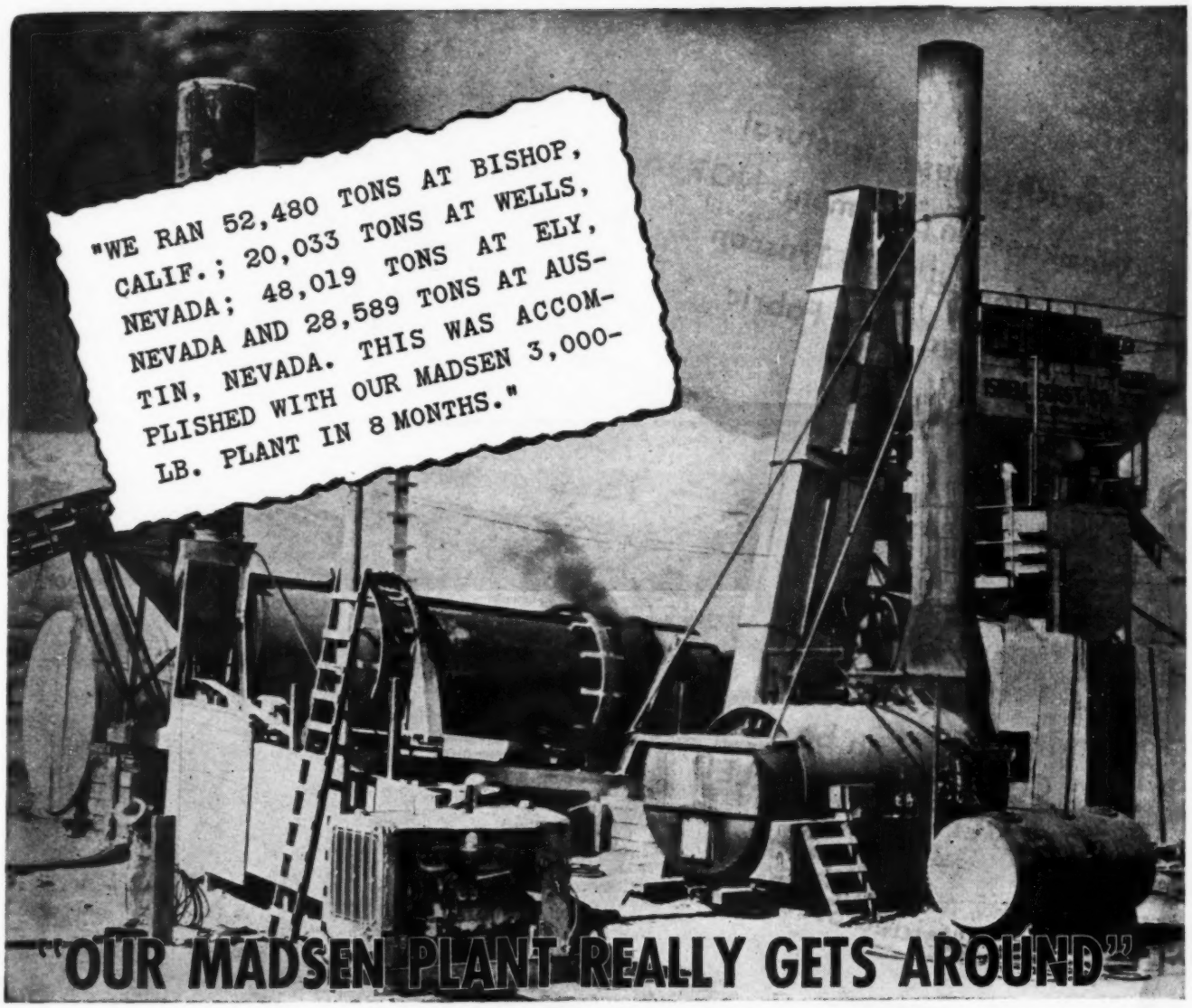
In Canada, **Renold-Coventry Ltd., Montreal, Toronto, Vancouver**

In Britain, **Crofts Engineers, Ltd., Bradford, England**



FAWICK *Airflex* CLUTCH

POWER CONTROLLED BY AIR


"WE RAN 52,480 TONS AT BISHOP, CALIF.; 20,033 TONS AT WELLS, NEVADA; 48,019 TONS AT ELY, NEVADA AND 28,589 TONS AT AUSTIN, NEVADA. THIS WAS ACCOMPLISHED WITH OUR MADSEN 3,000-LB. PLANT IN 8 MONTHS."

"OUR MADSEN PLANT REALLY GETS AROUND"

The field report, illustrated above, helps to prove another feature of Madsen's *superiority on the job.* Roadbuilders and contractors who travel from job to job recognize mobility and self-erection of Madsen Plants as outstanding in the field.

Here are two Madsen-exclusives that help to make this superiority possible.

JACK ERECTION SYSTEM: In cases where a crane is unobtainable or impractical for Plant setup the Madsen-patented jack erection system saves the day. When set up by power lift, a Madsen Plant can be erected for operation in 2 or 3 hours. Without power, and using one man on each of the four jacks, erection is accomplished in an 8-hour day.

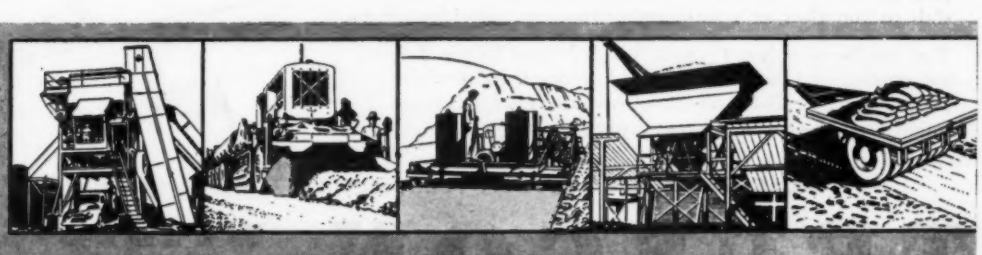
The Madsen jack erection system is simplicity itself ... no cranes, skids, ramps or winches.... another reason to specify Madsen.

MADSEN TWIN-SHAFT PUG MILL MIXER: Madsen engineering experience and precision parts make possible this sturdily constructed mixer that is easily capable of mixing a capacity batch in 30 to 40 seconds. This feature alone assures you 30 to 40 more batches *per day.*

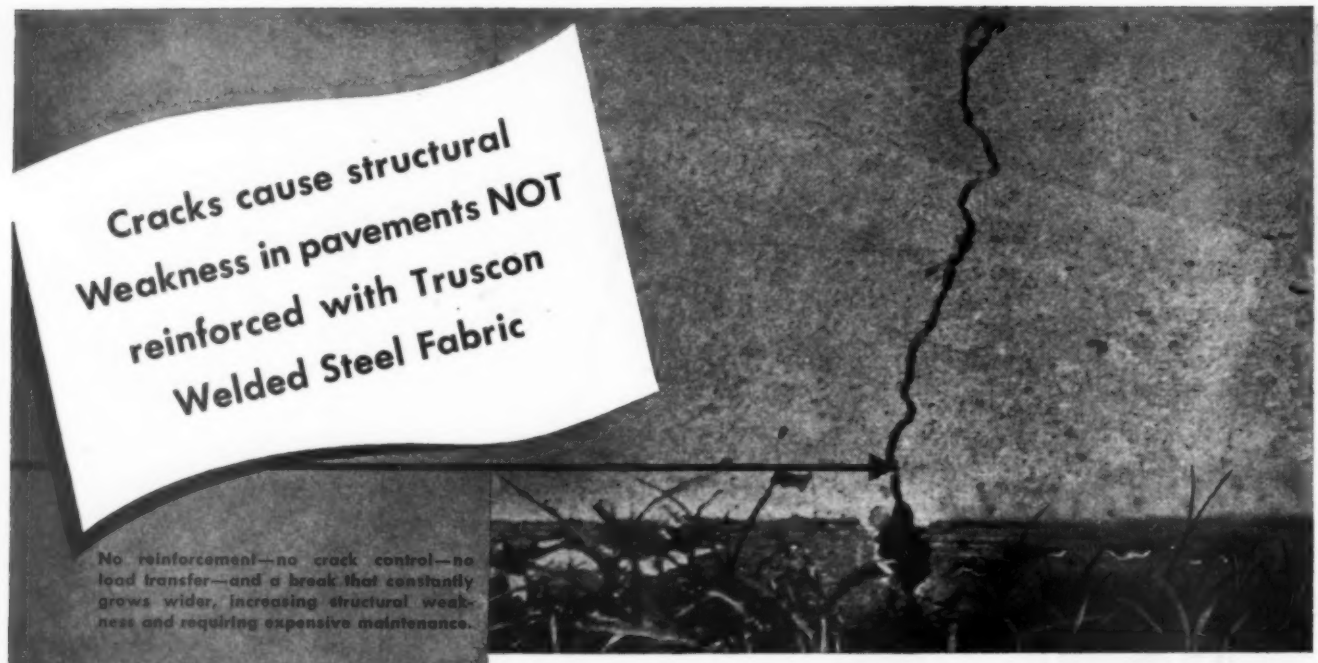
Madsen Asphalt Paving Plants are available in 500, 1,000, 2,000, 3,000, 4,000 and 6,000 lb. capacity, with or without jack erection. Write for descriptive Bulletin for more information on Madsen Plants.

MADSEN IRON WORKS
HUNTINGTON PARK • CALIF.

Write for Catalog



MADSEN ASPHALT PLANTS • ROAD PUGS • CEMENT FINISHERS • BATCHERS • COMPACTORS



Cracks cause structural Weakness in pavements NOT reinforced with Truscon Welded Steel Fabric

No reinforcement—no crack control—no load transfer—and a break that constantly grows wider, increasing structural weakness and requiring expensive maintenance.

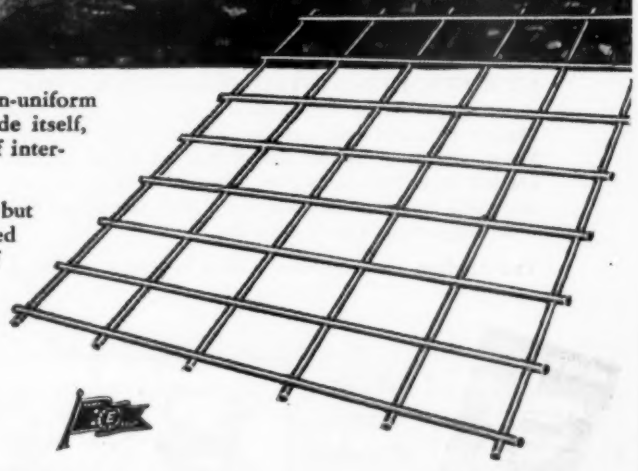
Cracking can be EFFECTIVELY CONTROLLED by Truscon Welded Steel Fabric

This slab is reinforced with welded steel fabric—the crack is tightly closed—slab ends interlocked—high load transfer capacity. This slab is same thickness, mix, age, and subjected to same climatic and subgrade conditions as slab above.

Traffic loads, variations in temperature and moisture content, non-uniform settlement of subgrade, and volumetric changes in the subgrade itself, all tend to deform concrete pavement slabs, inducing stresses of intermittent occurrence and of widely varying intensity.

Cracking in concrete pavements cannot be eliminated entirely, but experience has proved that when the pavement slab is reinforced with Welded Steel Fabric between joints, the formation of wide cracks is prevented. The reinforcing holds the aggregate of the fractured slabs in close contact and enables the slab to function as a unit rather than as individual parts.

You can be *sure* that Truscon Welded Steel Fabric Reinforcement, and associated Truscon Steel roadbuilding products, will build better, lower-cost roads for the communities you serve, and greater prestige for you.



TRUSCON STEEL COMPANY, Youngstown 1, Ohio • *Subsidiary of Republic Steel Corporation*

TRUSCON

Reg. U. S. Pat. Off.

WELDED STEEL FABRIC

• *Covers the Continent* •

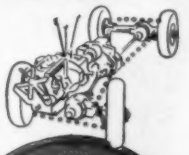
YOU CAN HANDLE a WIDER RANGE of JOBS with FWD TRUCK-POWER

In terms of job-range in highway service, FWDs do far more than conventional trucks.

In a single, one-man-operated unit, the FWD Road Maintainer, with underbody blade, hydraulically controlled from the cab, levels washboard surfaces, ruts and sink-holes . . . covers more miles per day in road maintenance or construction. In other than blade-work — hauling materials, earth moving, pulling heavy duty equipment, clearing snow — throughout all seasons of the year, the same FWDs make road funds stretch further by handling more jobs, much faster, at much less cost. More than 800 counties, 37 state highway departments, and thousands of townships and municipalities use FWDs in year 'round service. . . . Write for bulletin.

THE ONE TRUCK FOR MANY JOBS:

Road Patrolling and Maintenance • Material Hauling Earth Moving • Heavy Duty Pulling • Snow Clearing



FWD TRUCKS

THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

THE FOUR WHEEL DRIVE AUTO COMPANY
Clintonville, Wisconsin
Canadian Factory: KITCHENER, ONTARIO

FWD Model SU Truck equipped with underbody maintenance blade as recently purchased by city of Muskegon, Michigan

The Printing Crafts Building 461 8th Ave. N. Y. filled the printer's need for light, air and freedom from vibration.

Pressroom of Charles Francis Press, one of the tenants of the Printing Crafts Building.

When the printing industry went skyward

The tremendous weight and speed of modern printing presses require substantial, vibration-free floors . . . a real test for reinforced concrete. The problem became acute in New York where high realty values have made tall buildings a necessity.

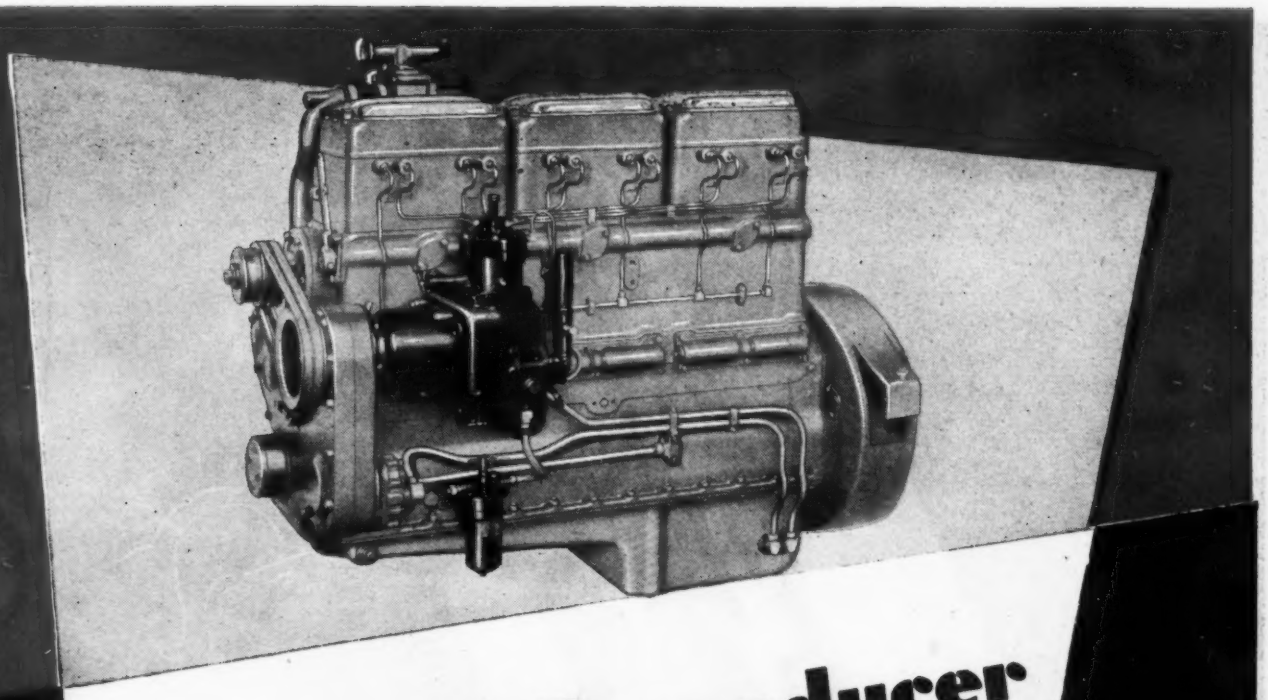
The printing industry went skyward in 1915, when the 23 story Printing Crafts Building was erected. In its construction specially designed connections locked the entire steel framework into a rigid, vibrationless structure, while the 500,000 square feet of Clinton Welded Fabric used in the floors provided the strength necessary to stand the strain of rapidly operated, heavy presses.

In this building, as in thousands of structures built since its invention in 1902, Clinton Electrically Welded Fabric is providing endurance to concrete, with a minimum of maintenance. Characterized by its perfect wire and welds, uniformity, and high tensile strength, Clinton Fabric is the choice of many leaders in the construction field. Try it on your next reinforced concrete job.

WICKWIRE SPENCER STEEL COMPANY

500 FIFTH AVENUE, NEW YORK (18), N. Y.

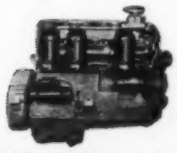
ABILENE • BOSTON • BUFFALO • CHATTANOOGA • CHICAGO • CLINTON (MASS.) • DETROIT • HOUSTON • LOS ANGELES
PHILADELPHIA • SAN FRANCISCO • TULSA • WORCESTER



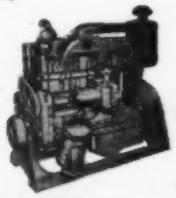
The PROVED producer of low-cost yardage

In choosing the power for your new earth-moving and material handling equipment, make sure that you get a *proved* producer of low-cost yardage. That Cummins Diesel power is such a producer—a producer of *faster, cheaper* yardage—has been demonstrated by its 12-year performance record in trucks, shovels, draglines, dredges, compressors, rock-crushers and virtually every other type of portable or stationary application. As a result, Cummins Dependable Diesels are now standard with successful contractors and aggregates producers everywhere . . . are offered as standard or optional power by leading construction equipment manufacturers.

CUMMINS ENGINE COMPANY, INC., Columbus, Indiana



Model HB-600: Automotive engine, 6 cylinders, 4⅞″ x 6″, 150 hp. at 1800 rpm. (maximum).



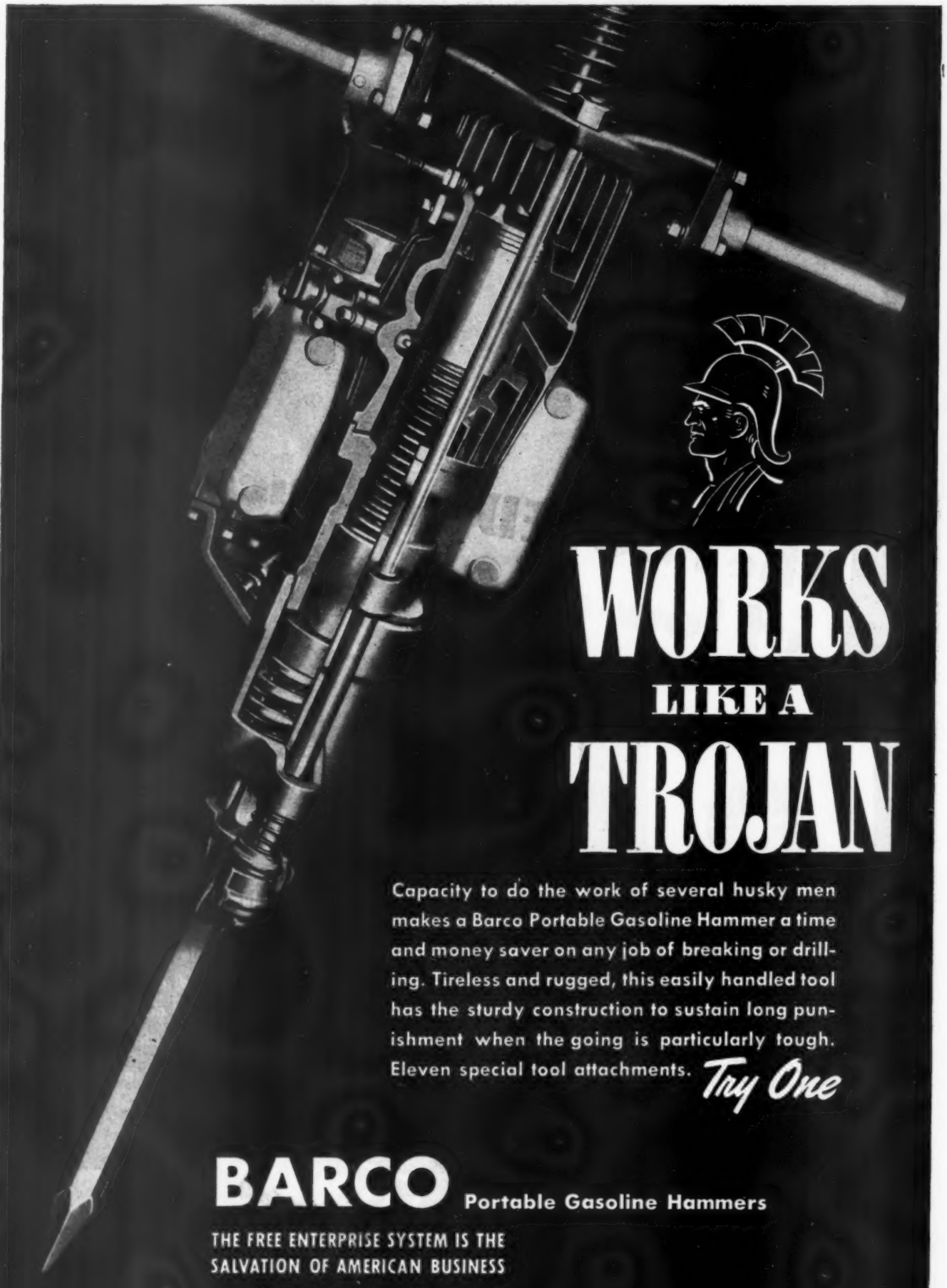
Model NHI-600: Power unit, 6 cylinders, 5½″ x 6″, 200 hp. at 2100 rpm. (maximum).

Model NHPS-600: Supercharged power unit, 6 cylinders, 5½″ x 6″, 275 hp. at 2100 rpm. (maximum).

The line of Cummins Dependable Diesels includes automotive, portable, stationary and marine models—50 to 275 hp.

CUMMINS Diesels

SINCE 1919...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS



WORKS LIKE A TROJAN

Capacity to do the work of several husky men makes a Barco Portable Gasoline Hammer a time and money saver on any job of breaking or drilling. Tireless and rugged, this easily handled tool has the sturdy construction to sustain long punishment when the going is particularly tough. Eleven special tool attachments. *Try One*

BARCO Portable Gasoline Hammers

THE FREE ENTERPRISE SYSTEM IS THE SALVATION OF AMERICAN BUSINESS

BARCO MANUFACTURING COMPANY, NOT INC., 1815 Winnemac Ave., Chicago 40, Ill. • In Canada: The Holden Co., Ltd., Montreal, Can.

LITTLEFORD

"SPRAY MASTER"

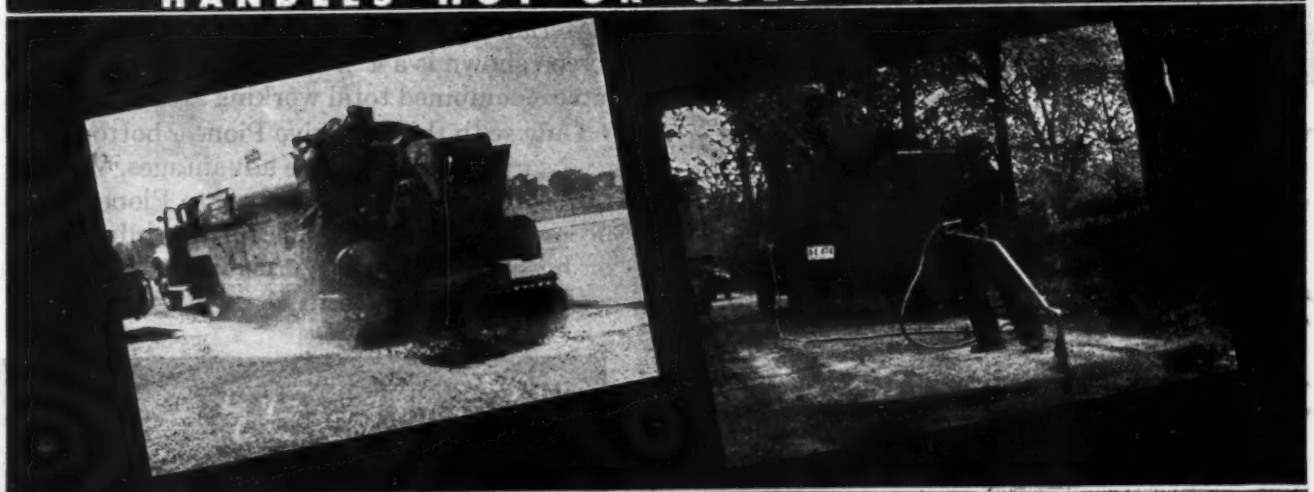
The Master of Road Building

When building or maintaining Raods, Streets, Highways or Airport Runways let the "Spray Master" speed up work; cut the cost of applying Tar, Asphalt, Emulsions or Road Oils.

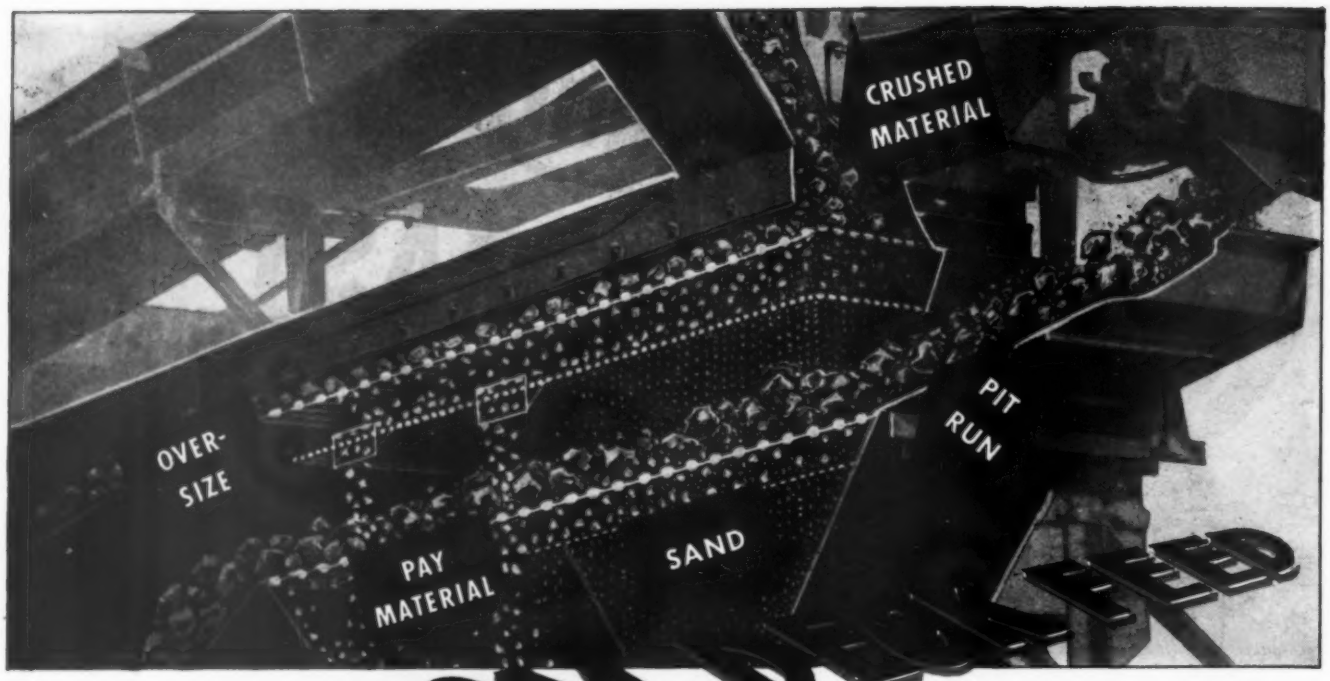
The "Spray Master" with the *Vacuum Flow Full Circulating Spray Bar* is one of the fastest and most efficient spraying units ever designed. This Circulating Bar circulates the materials through the Bar by *Vacuum not pressure*. It sprays under pressure with a Bar up to 24 ft. in width.

"Spray Master" is the master of Road Building, have one of these low cost Spraying units on your next road construction job.

HANDLES HOT OR COLD MATERIALS



LITTLEFORD BROS., INC. . . . 454 EAST PEARL ST., CINCINNATI, OHIO



BOTTOM

EXCLUSIVE PIONEER FEATURE

Doubles effective screen area-

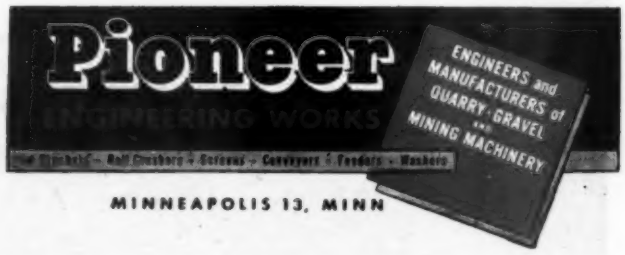
YOU GET THESE ADVANTAGES:

1. **Balance the work of the two crushers without changing screens.**
2. **Produce "stone chips" in the main screen without extra screen equipment.**
3. **Control the gradation of the output to meet specifications.**
4. **Reject sand and control the percentage of sand rejected.**

Duplex screening is Pioneer's radical innovation to handle the extra gradation to be done where two crushers are used in a gravel or quarry plant.

Pioneer makes one vibrator screen do the work of two. Pit material is screened on the bottom deck and the crushed material on the top deck. Both decks produce specification or pay material and "chips" can be separated. The screen shown is a 4′ x 12′ unit whose two decks have a combined total working area of 96 sq. ft.

Only with this exclusive Pioneer bottom deck feed can you get all these advantages. Write or talk to Pioneer Plant users, or to Pioneer engineers and distributors for further information on how to handle large crushing capacity with a single screening unit.



THE JOB...

CLEMENTS & CO.
CONTRACTOR
TELEPHONE 1500 • P. O. BOX 277 • 941 ATHERTON ST.
HAYWARD, CALIFORNIA

May 22, 1945

C. H. Grant Company
435 Bryant Street
San Francisco, California

Subject: Adnun Black Top Paver

Gentlemen:

About two years ago we bought a used Adnun from Harms Brothers after they had used the machine on the Airport at Minden, Nevada. As this was our first experience with an Adnun, we carefully watched its performance and its operating costs.

One of our first jobs on which we used the machine, was the mountainous grade running out of Redding toward Weaverville, and which naturally presented practically every problem known to black top paving. We believe that the State Engineers were as pleased as we were with the [illegible] under these severe conditions, and in fact we have been told that this is one of the finest black top jobs in this territory.

Since that time, we have used the Adnun on practically every type of black top job and after this lengthy experience, we can say without qualification that we can turn out the highest quality of pavement with this machine.

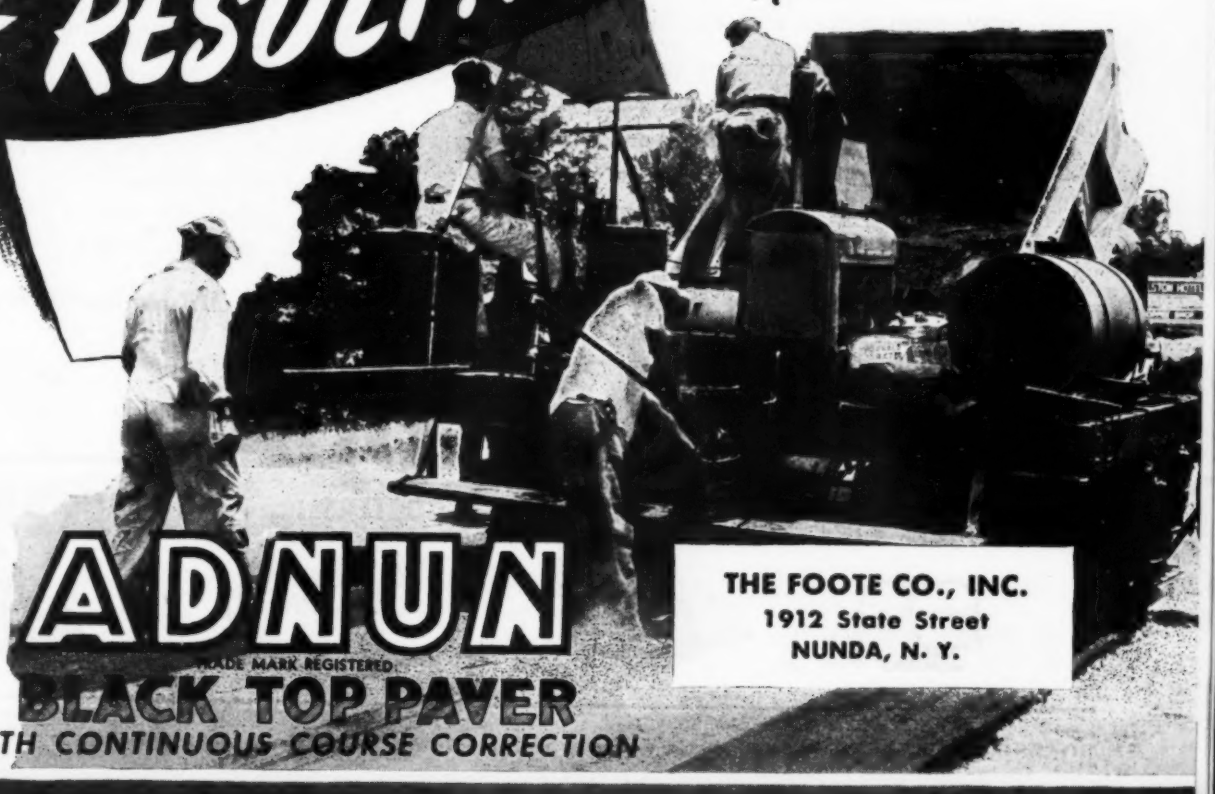
Furthermore, due to the simplicity of design and rugged construction, our repair costs have been far below anything we have previously experienced.

It is a pleasure to send you these thoughts on the Adnun as the machine thoroughly deserves our most hearty recommendation.

Yours respectfully,
CLEMENTS & COMPANY

By A. A. Whale

THE RESULT...



MULTIFOOTE CONCRETE PAVERS

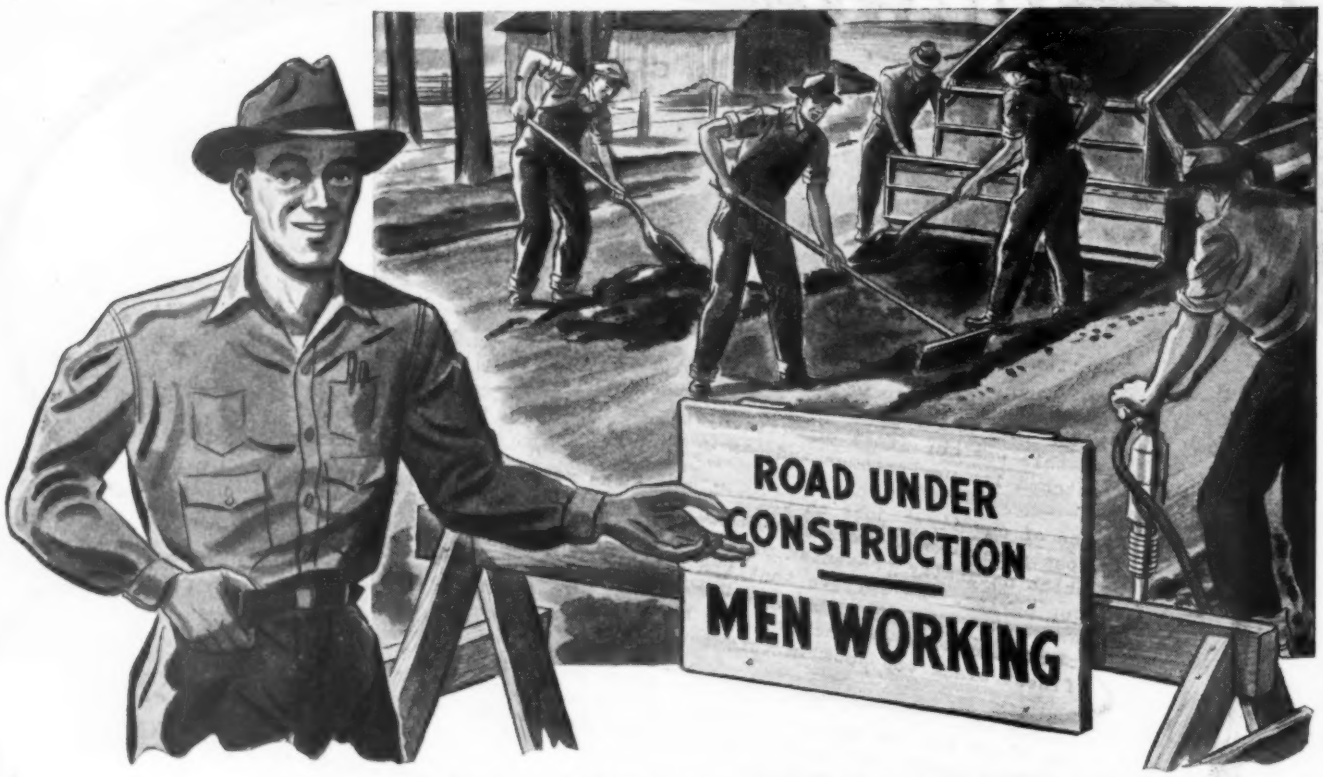
ADNUN

TRADE MARK REGISTERED

BLACK TOP PAVER

WITH CONTINUOUS COURSE CORRECTION

THE FOOTE CO., INC.
1912 State Street
NUNDA, N. Y.



HOW MANY OF THESE SIGNS WILL THERE BE IN YOUR COUNTY?

YOUR city, county and state can do its part in providing employment for returning veterans—can stand to gain modern highways, roads and streets—can share in a prosperous postwar future—by its cooperation in a national program for highway construction and rehabilitation.

The Federal Government has already appropriated 1½ billion dollars for this postwar project for employment and progress. By matching the Federal funds allocated, every state or municipality can directly share in the benefits of this sound program.

It is vital that well developed plans for action be ready now.

It is in the interest of every American to support actively this plan sponsored by the American Road Builders Association. Make sure your community benefits—your state legislators will welcome enthusiastic public interest.

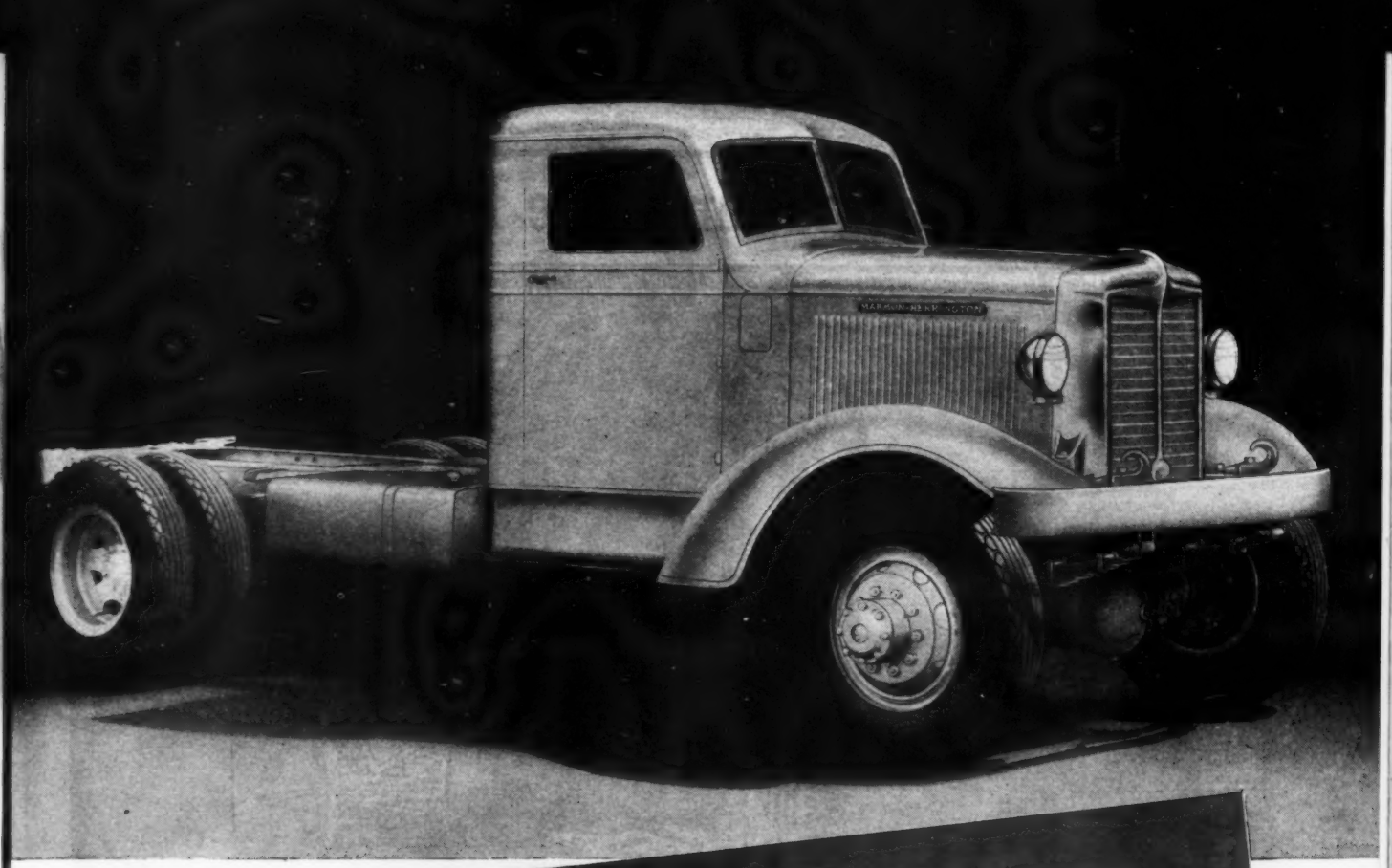
• • •

"The Road Ahead," a booklet published by the American Road Builders Association, 1319 F St., N.W., Washington, D. C., presents this national postwar project and its benefits in detail — write for your free copy.

CLEAVER-BROOKS COMPANY, 5106 N. 33rd Street, Milwaukee 9, Wisconsin

Cleaver-Brooks

TANK CAR HEATERS . . . BITUMINOUS BOOSTERS . . . AUTOMATIC STEAM PLANTS



Back in "Civvies" Again

2 NEW HEAVY DUTY *All-Wheel-Drives!*

Better even than the Marmon-Herringtons which performed such marvels of extra-difficult transportation before and during the war, these new, more powerful, streamlined models have many features unmatched in any other trucks.

Along with the tried and approved Marmon-Herrington engineering features of greater approach angle, low center of gravity and wide range of gear ratios, still greater ease of steering, more positive braking and many refinements in details are offered to every Marmon-Herrington purchaser.

For operation in construction, road building and road maintenance services they have no equals. For snow-removal they top all previous records. For the gruelling cross-country jobs of the oil fields and logging "shows" they are unbeatable.

These are the trucks you need for all kinds of difficult hauling through the deep snow, mud and sand, or up grades too steep for "ordinary" trucks.

Ask for literature describing these Heavy Duty *All-Wheel-Drive* models and Marmon-Herrington *All-Wheel-Drive* converted Fords—the fastest, most maneuverable and most economical *All-Wheel-Drives* on the market.

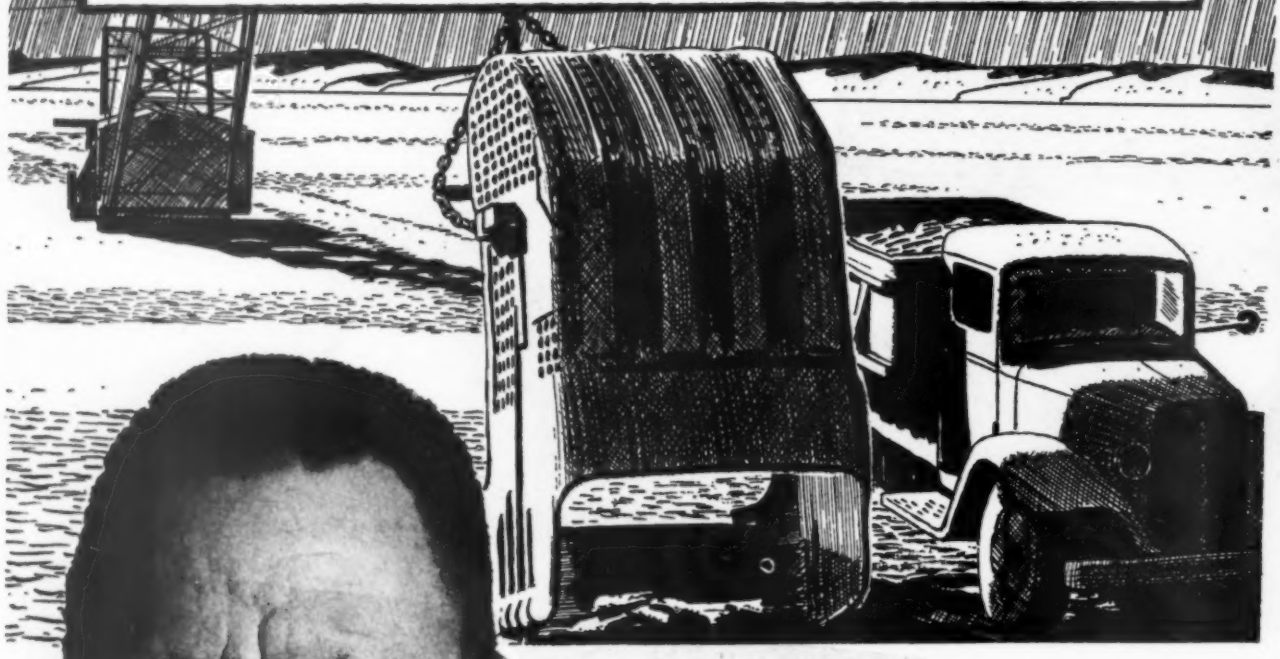
MARMON-HERRINGTON

All-Wheel-Drive TRUCKS

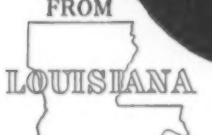
MARMON-HERRINGTON CO., Inc., INDIANAPOLIS 7, INDIANA

Cable Address: MARTON

"...have used nothing else for 10 years"



FROM LOUISIANA



EDWARD SWAN, General Manager
Walter P. Villere, General Contractor
New Orleans, Louisiana

One of a series of testimonial letters received from all parts of the United States

"...our company uses in the construction business one of the largest draglines in the South, a Walking Monagan, capable of handling 10 cubic yards of dirt at a time.

...machine which is now working on an emergency levee building job on the Mississippi River at Baton Rouge, is powered by a Fairbanks Diesel motor.

...as you know, a Diesel motor operates faster, and under increased pressure of heat, ordinary oils form carbons and plug up piston rings...power and compression are cut to an alarming extent.

...ten years ago Macmillan Ring-Free Motor Oil was recommended as a solution to the problem of keeping machine in prime working order...we have used nothing else since.

...having been around machinery all my life, have yet to see any other motor oil accomplish in both Diesel and gasoline motors what Macmillan Ring-Free can do."

Excerpts of letter from— Edmund Swan

Other equipment operated by Villere Company: two P. H. Shovels, 1¼ yard capacity with Waukesha motors; four 1½-Ton Ford Trucks, one 1½-Ton International, one 1-Ton Diamond T; 1940 Imperial Chrysler, 1942 Oldsmobile, 1936 Chrysler, 1941 Plymouth. On Macmillan Ring-Free, of course!

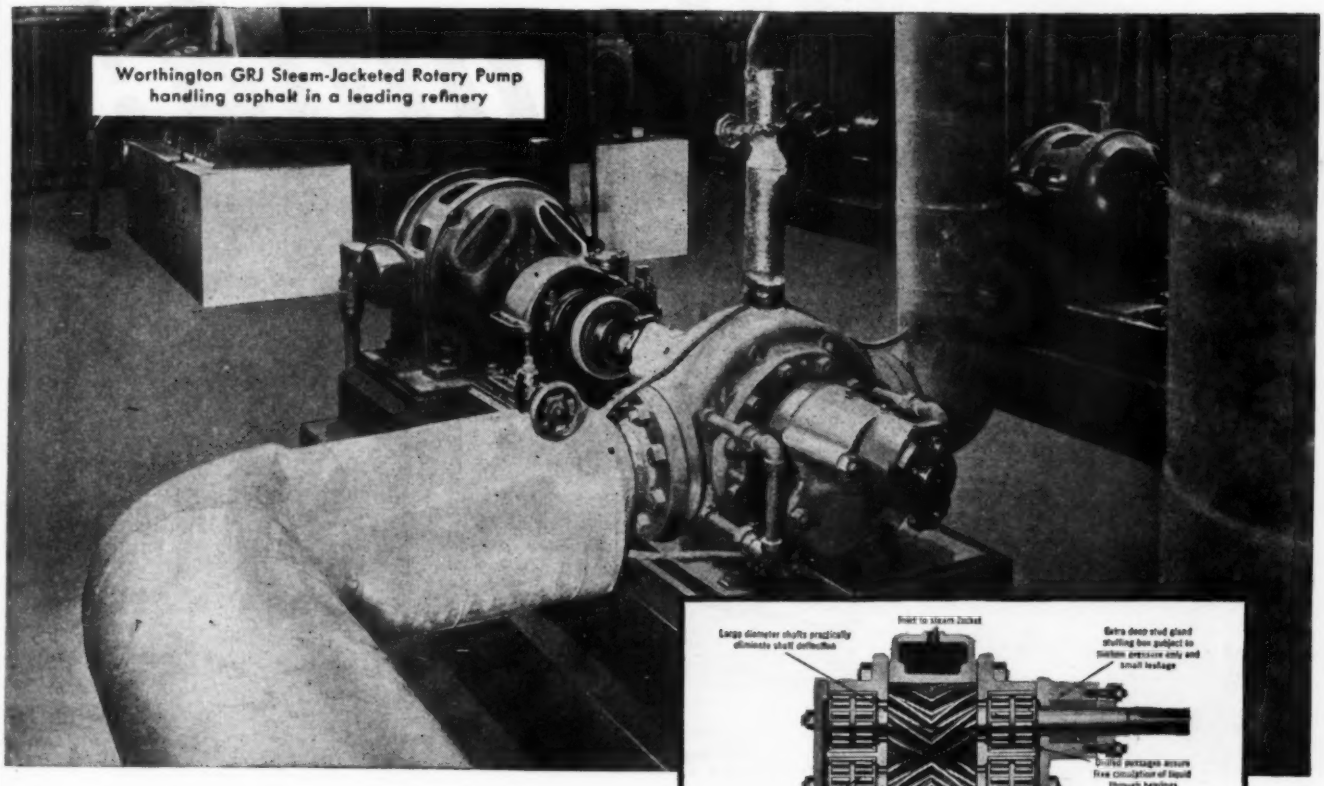
MACMILLAN RING-FREE MOTOR OIL

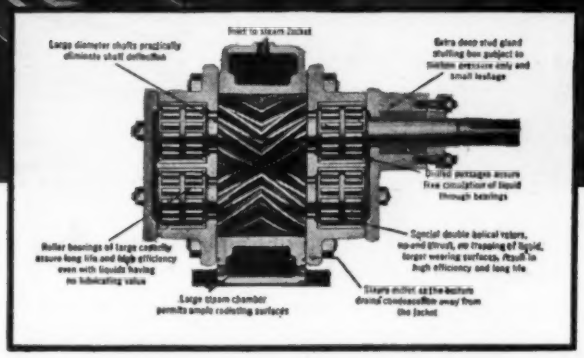
Operators of all types of equipment report lower-cost, more efficient performance with Macmillan Ring-Free Motor Oil. Find out how it can help lick your toughest lubrication problems... Phone or write the nearest Macmillan office.

MACMILLAN PETROLEUM CORPORATION

50 W. 50th Street, New York 20 • 624 So. Michigan Avenue, Chicago 5 • 530 W. Sixth Street, Los Angeles 14 • Copyright 1945, Macmillan Petroleum Corporation

THE STEAM-JACKETED PUMP THAT GETS ASPHALT OFF TO A GOOD START




Large diameter shafts practically eliminate shaft deflection
Extra deep stud gland stuffing box subject to liberal pressure only and small leakage
Drilled passages assure free circulation of liquid through bearings
Special double helical rotors, no end thrust, no trapping of liquid, larger wearing surfaces. Result: high efficiency and long life
Roller bearings of large capacity assure long life and high efficiency even with liquids having no lubricating value
Large steam chamber permits ample rotating surfaces

. . . *is also your best bet at the finish*

One thing contractors and refiners have in common is whole-hearted respect for the in-built stamina of Worthington Steam-Jacket Rotary Pumps. As a matter of fact, many contractors don't even know that Worthington GRJ Rotary Pumps are installed right in their road oilers, pavers, and trucks. That's because these dependable asphalt handlers have a habit of staying out of trouble . . . so never call attention to themselves.

That's why you'll want to have these same trouble-dodgers keeping asphalt on the go from tank cars to storage tanks to tank trucks to the machines that apply it.

GET ALL THE FACTS

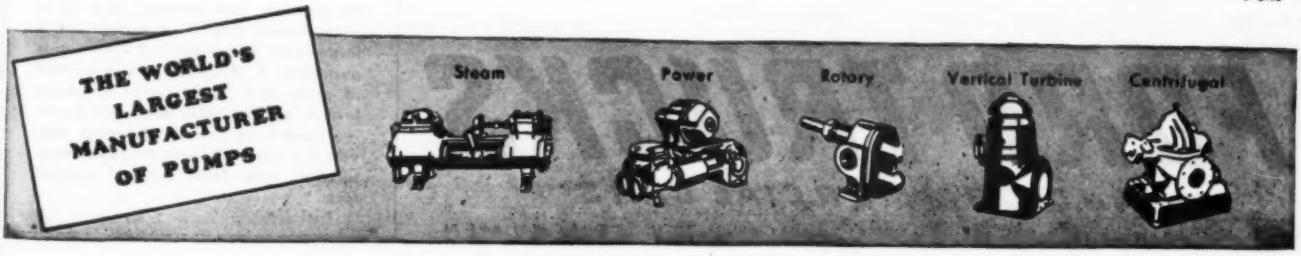
For vital facts a contractor should know about Steam-Jacketed Rotary Pumps for handling asphalt, write for Bulletin W487-B11. It proves that *there's more worth in Worthington. Worthington Pump and Machinery Corporation, Harrison, N. J.*

WHY WORTHINGTON GRJ ROTARIES CAN TAKE IT

1. **ROLLER BEARINGS** with more capacity than any other rotary pump.
2. **STUFFING BOX** much deeper than the average.
3. **SPECIAL DOUBLE HELICAL ROTORS** with larger wearing surfaces, free from end-thrust.
4. **HUSKY SHAFTS** mean trouble-free stuffing boxes.

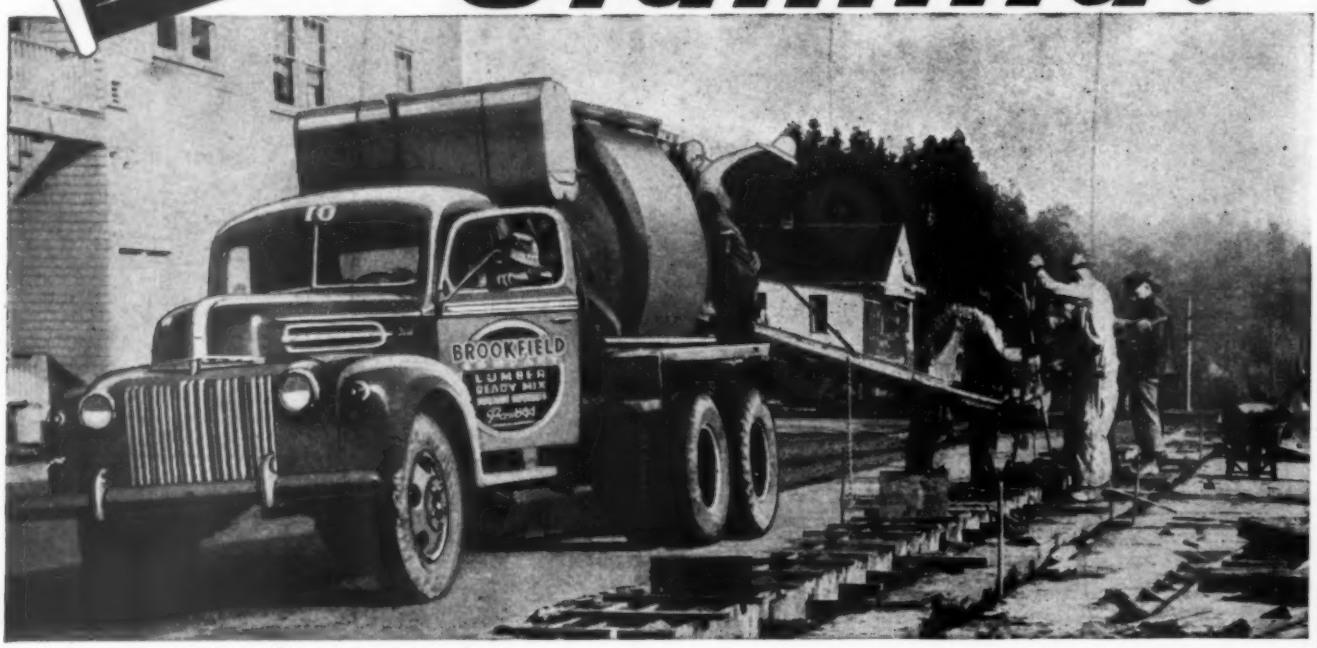
WORTHINGTON

P 5-15



MORE FORD TRUCKS ON THE ROAD • ON MORE JOBS • FOR MORE GOOD REASONS

TRUCK-ENGINEERED **Stamina!**



"...an Excellent Long-Term Investment"

THERE'S sound dollars-and-cents reasoning behind the selection of Ford Trucks by so many highway and airfield construction contractors.

Ford Truck sturdiness and reliability are facts which can be verified by merely asking any one of hundreds of fleet owners. And the moderate cost of the Ford Truck, and of whatever replacement parts you may later require, commend these rugged vehicles to every operator who must keep his overhead aggressively competitive.

Mr. R. C. Larson, president of the Brookfield Company, of Astoria, Oregon, one of whose Ford Trucks is pictured above, at work on Oregon's Nehalan Highway, sums up his experience in typical Ford fleet-owner style in a letter:

"We do not hesitate to recommend Ford Trucks as an excellent long-term investment. We have been using them since 1941, beginning with two. At the end of 1944 we were operating six truck mixers. They have proved very satisfactory during the four years we have operated them steadily."

Such performance has made Ford first choice of America's truck operators. Doesn't it strike you as ample reason for giving serious thought to new Fords for *your* fleet?

They're available now, in limited quantities, for essential civilian service. See your Ford Truck Dealer without delay.

Ford

FORD ADVANCED TRUCK ENGINEERING

More Economy • More Endurance
Easier Servicing

A STILL GREATER 100 HP V-8 ENGINE with NEW Ford steel-cored Silvaloy rod bearings, more enduring than ever in severe service • NEW aluminum alloy cam-ground pistons with 4 rings each, for oil economy • BIGGER, more efficient oil pump and IMPROVED rear bearing oil seal • NEW rust-proofed valve springs • NEW efficiency in cooling • in carburetion • in lubrication • Far-reaching ADVANCEMENTS in ease and economy of servicing operations.

IMPORTANT FORD CHASSIS ADVANTAGES: Easy accessibility for low-cost maintenance • Universal service facilities • Heavy-duty front axle • Extra-sturdy full-floating rear axle with pinion straddle-mounted on 3 large roller bearings • 3 axle ratios available • 2-speed axle available at extra cost • Powerful hydraulic brakes, exceptionally large cast drums • Long-lived needle bearing universal joints • Rugged 4-speed transmission with NEW internal reverse lock.

FORD TRUCKS

AND COMMERCIAL CARS

TRUCK-ENGINEERED • TRUCK-BUILT • BY TRUCK MEN

Flash — On every competitive test to date, LaPlant-Choate's new 8-yard cable-operated scraper has "run rings around" all other competitive scrapers tested. A limited number are already in the field, with everything set for economical mass production as soon as military conditions permit. You'll agree — it's a scraper well worth waiting for!

THOUSANDS OF SATISFIED OWNERS AGREE

It's LPC *for* LOWEST POSSIBLE COST

TRADE MARK

There are many good reasons why thousands of successful operators who have been using LaPlant-Choate rigs for years will keep right on buying them after the war. For one thing, these long-time users know from experience that LPC dozers and scrapers consistently move more yardage faster and at lower cost. They also know that LaPlant-Choate performance and dependability have been *job-proved around the world* under all types of conditions. And best of all, these veteran operators know that LaPlant-Choate will continue to lead the way in developing new improvements because LPC's entire organization is *strictly "tractor-equipment-minded"* . . . with more years of specialized "know-how" than any other company in the industry. So it all adds up to LPC—for lowest possible cost and better results—on your jobs, too. See your LPC-"Caterpillar" distributor today. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; San Leandro, California.

ARMY E NAVY

LAPLANT EARTHMOVING AND LAND **CHOATE** CLEARING EQUIPMENT

THERE IS A JOB-PROVED LA PLANT-CHOATE RIG FOR EVERY EARTHMOVING AND LAND CLEARING NEED

ALL TYPES OF DOZERS — Straight or angling blade, hydraulic or cable operated, for every size of track-type tractor.

LARGE OR SMALL SCRAPERS — Hydraulic or cable operated, front or rear dump, for use with your wheel or track-type tractors.

CABLE OPERATED RIPPERS — For ripping up hard ground, shale or concrete to facilitate loading with LPC "Carrimor" Scrapers.

LAND CLEARING TOOLS — A complete line of Brush Cutters, Treedozers, Rootcutters and Brush Rakes—all are interchangeable.

SIGN OF DEPENDABLE TRANSPORTATION

● Where you see the Ward LaFrance Dealer Symbol displayed, you'll find an alert merchant with something new and better in rugged, low-cost transportation to sell . . . The new Ward LaFrance commercial truck models are built BIG all the way through . . . with payload capacity running up to thirty tons . . . big wherever extra size, extra strength, or extra power can add to dependability of service, or hauling economy.

In Ward LaFrance heavy-duty trucks, you will discover an entirely new standard of reliability and performance. Prove it to yourself by visiting your Ward LaFrance dealer. If there is no dealer in your locality, write our Sales Department for interesting details.

GAI

WARD LaFRANCE

TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC. • ELMIRA, NEW YORK

TRACTOR SITUATION IMPROVED

More Allis-Chalmers Diesels in the smaller models are now tagged for civilian use. This largely means HD-7's, although HD-10's will also be available in greater quantity.

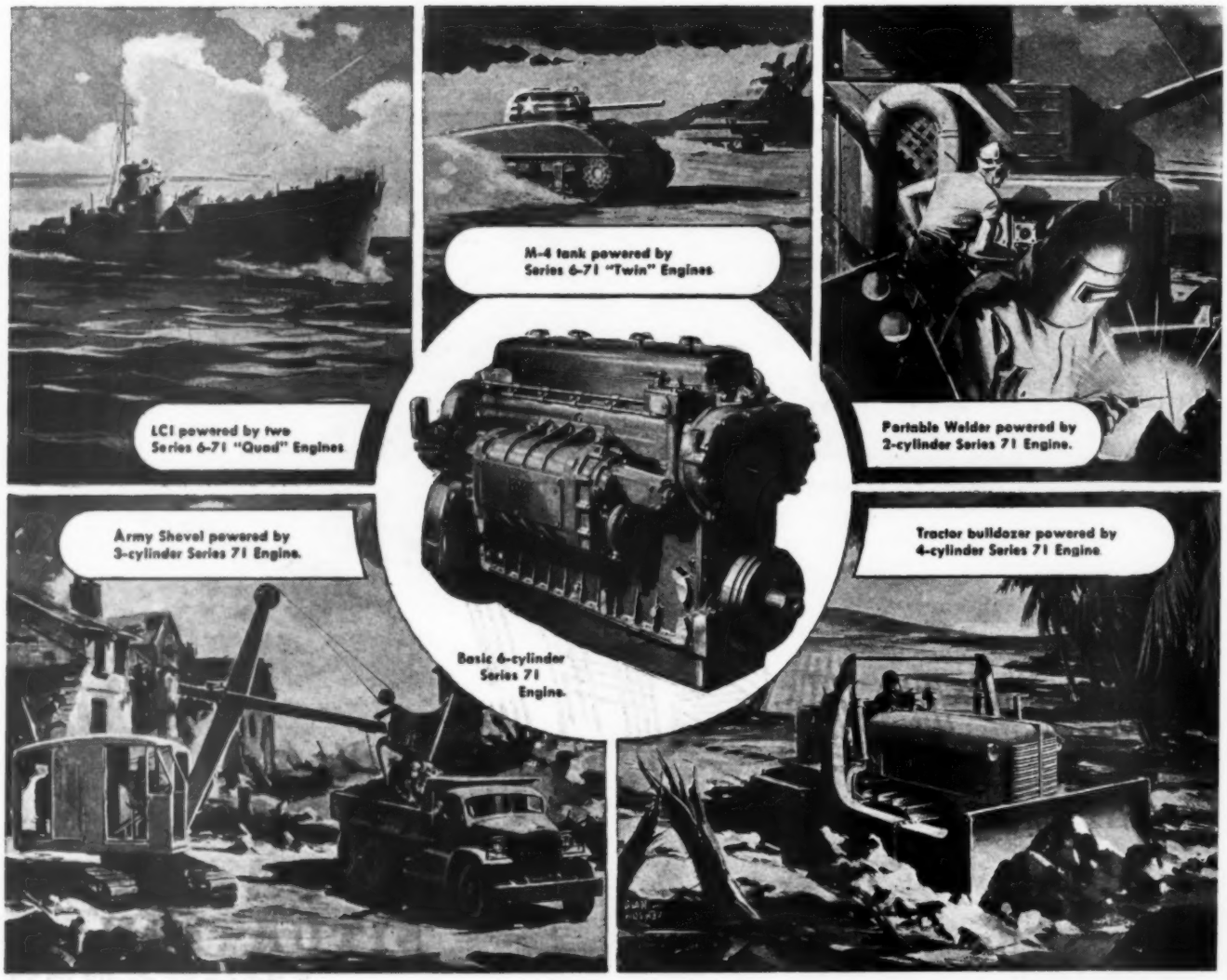
Because of the big demand, production will still be allocated—of necessity, essential users come first. This does, however, mean many more tractors to go around . . . an easing of the situation!

We are continuing our high production to more quickly satisfy essential needs. Let your Allis-Chalmers dealer help determine your eligibility.

With 60 drawbar h. p., the HD-7 gives you ample power to handle suitable 2- or 4-wheel scrapers, pusher loading, bulldozing and the pulling of graders, sheep-foot rollers, other equipment. Fast working speeds to hurry the job—up to 6.27 m. p. h. Electric starting and operation on Diesel fuel! 200-hour truck wheel and front idler lubrication!

ALLIS-CHALMERS
TRACTOR DIVISION · MILWAUKEE 1, U. S. A.

★ *2-Cycle*
THE MODERN DIESEL POWER


LCI powered by two Series 6-71 "Quad" Engines
M-4 tank powered by Series 6-71 "Twin" Engines
Portable Welder powered by 2-cylinder Series 71 Engine.
Army Shovel powered by 3-cylinder Series 71 Engine.
Basic 6-cylinder Series 71 Engine.
Tractor bulldozer powered by 4-cylinder Series 71 Engine

THERE WHEN NEEDED

In addition to providing plenty of dependable power for the machines our fighting men use, this engine, because of its interchangeable parts, helps them keep everything on the move.

For example, a shell-torn shovel or tractor engine can be fixed with an engine part from a wrecked landing craft. A landing craft can keep going by picking up a part it needs from a disabled tank.

Every GM Series 71 engine, whether a two-cylinder or one of a "Quad" six, has the same bore and stroke, and most moving parts from one engine will fit and work perfectly in any other.

This feature of interchangeability of parts in these engines will be equally important in peacetime. The elimination of *different* sizes of parallel parts increases the availability to owners of the right part *when it is needed.*

In construction, fishing, transportation and all through industry, these "Single", "Twin" or "Quad" GM Diesels will provide dependable, low-cost and *easily maintained power.*

KEEP AMERICA STRONG
BUY MORE WAR BONDS

GM DIESEL POWER

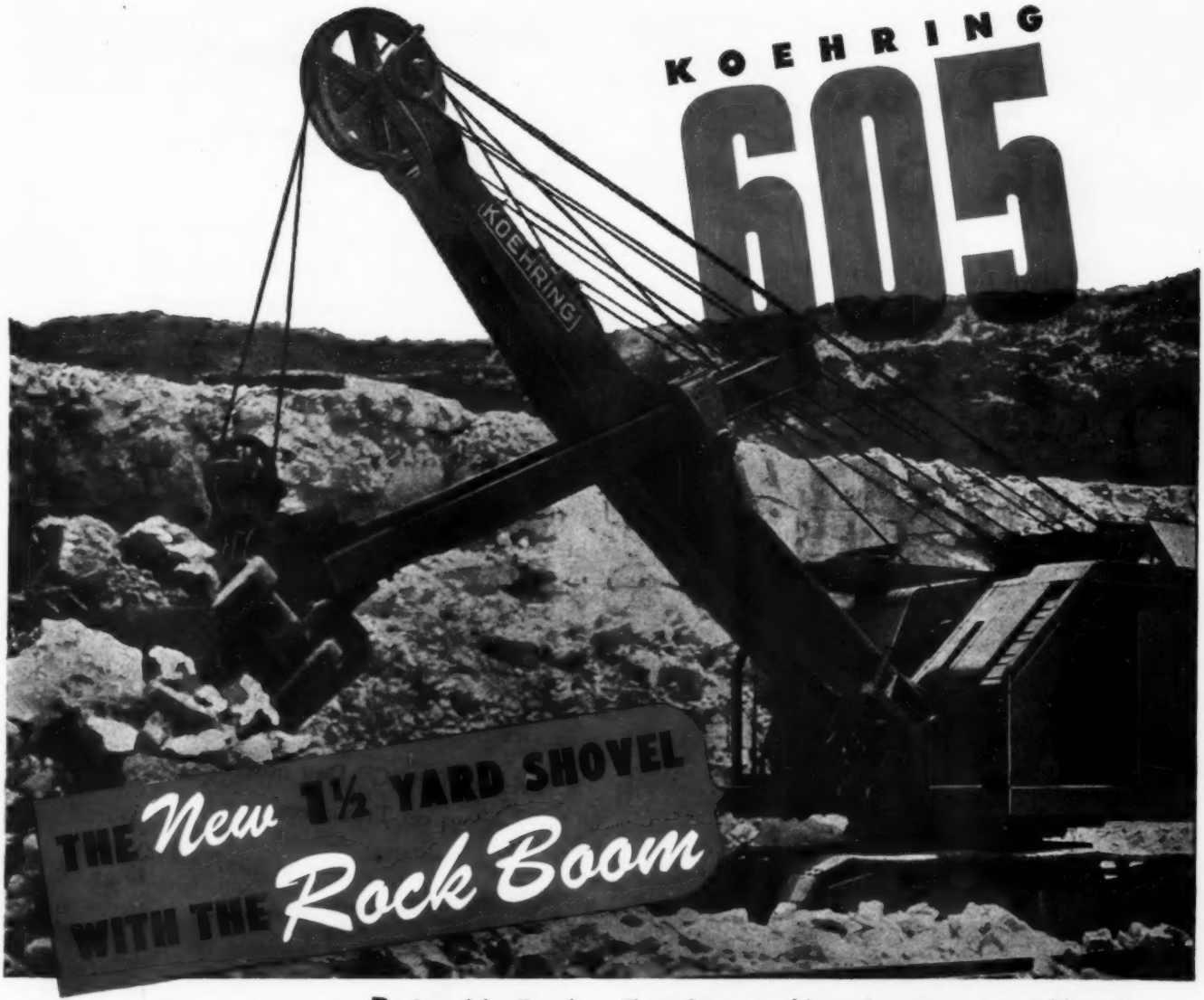
SINGLES . . . Up to 300 H.P.
MULTIPLE UNITS . . . Up to 800 H.P. — DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.

ENGINES . . . 150 to 2000 H.P. — CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

LOCOMOTIVES — ELECTRO-MOTIVE DIVISION, La Grange, Ill.

KOEHRING

605



THE *New* 1½ YARD SHOVEL
WITH THE *Rock Boom*

Designed for Tough Rock Digging. Heavy welded box boom. Boom-foot shock absorber takes out lateral twisting strains. Larger shipper-shaft sprocket gets more push into crowd action. Chain drive tightened by power. Three-foot boom point sheaves go easy on hoist cables. Straight, simple shipper shaft comes out easily. No boom weakness below shipper shaft because shipper shaft is set into upper edge of boom, not through center.

These base machine advantages, too, add up to better rock performance: Separate crawler frames provide the flexibility needed for tough digging. Adjustable hook rollers make possible the fine adjustment that eliminates tipping. Power clutch, set by 15-pound pull, retains "feel" of load. Straight splined shafting, not weakened by shoulders and keyways, adds digging strength.

KOEHRING COMPANY, Milwaukee 10, Wis.

ASK FOR YOUR 605 CATALOG *Today.....*

KOEHRING COMPANY, Dept. S, Milwaukee 10, Wis.

PLEASE SEND NEW 605 EXCAVATOR CATALOG TO:

COMPANY NAME

STREET ADDRESS

CITY AND ZONE STATE

ARMY E NAVY

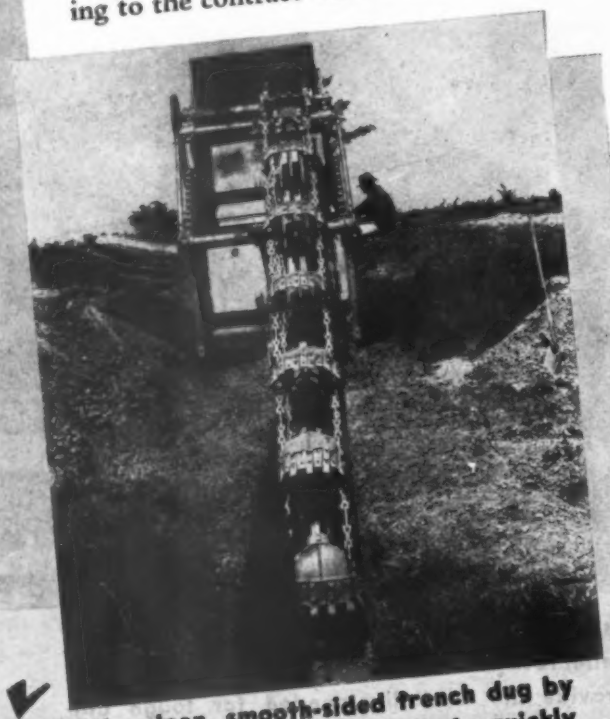
KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

Be Ready for "C" Day with Buckeye Trenchers!

"C" Day is the day when competitive bids will be let once more on trenching jobs and other construction work. Contractors who successfully bid and complete jobs according to the contract will do so because they have *the right equipment* with which to do the job. Buckeye Trenchers are *the right equipment* for trenching jobs, because they are built to stay on the job day in and day out, digging maximum yardages at the lowest cost. You take no chance in buying Buckeye Trenchers for today's work as well as for close bid postwar business. They have proved their capabilities by setting cost-cutting records on all sizes of trench construction from giant intercepting sewer trenches up to 12′ wide and 24′ deep, down to small municipal service trench.

Prepare for "C" Day now. Send today for catalogs on Trenchers.



Note the clean, smooth-sided trench dug by the Buckeye 120. Digging boom can be quickly and easily shifted from one side to the other for passing obstructions. Cuts trench 16" to 48" wide and up to 11'6" deep (60" width and 15' depth with optional equipment).

Buckeye model 410 at work on an Ohio sewer project. The 410 is ideal for use in the close confines encountered in city work. Digs trench 18" to 24" wide and up to 6' deep (7'6" depth optional).

NAVY

Built by Buckeye

Buckeye Traction Ditcher Co., Findlay, Ohio

Convertible Shovels

Trenchers

Tractor Equipment

Road Wideners

R-B Finegraders

Spreaders

WHEN THERE'S WORK TO BE DONE...

TRAXCAVATE

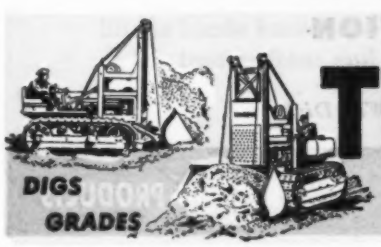
T7 TRAXCAVATOR on big excavation job in St. Louis, Missouri

IT'S the practical, speedy, profitable way to do many earth moving and material handling jobs. In all construction work, TRAXCAVATORS are recognized as the most rugged and versatile machines for digging, grading, loading, carrying and many other tasks. Your TRACKSON-"Caterpillar" dealer will gladly give you the complete TRAXCAVATOR story, or write to TRACKSON COMPANY, Dept. RS-65, Milwaukee 1, Wisconsin.

A T2 tight-excavating in small basement at Cheyenne, Wyoming

TRAXCAVATOR fine-grading between forms on Indiana road job

Loading trucks at Vallejo, California, housing project with a T2

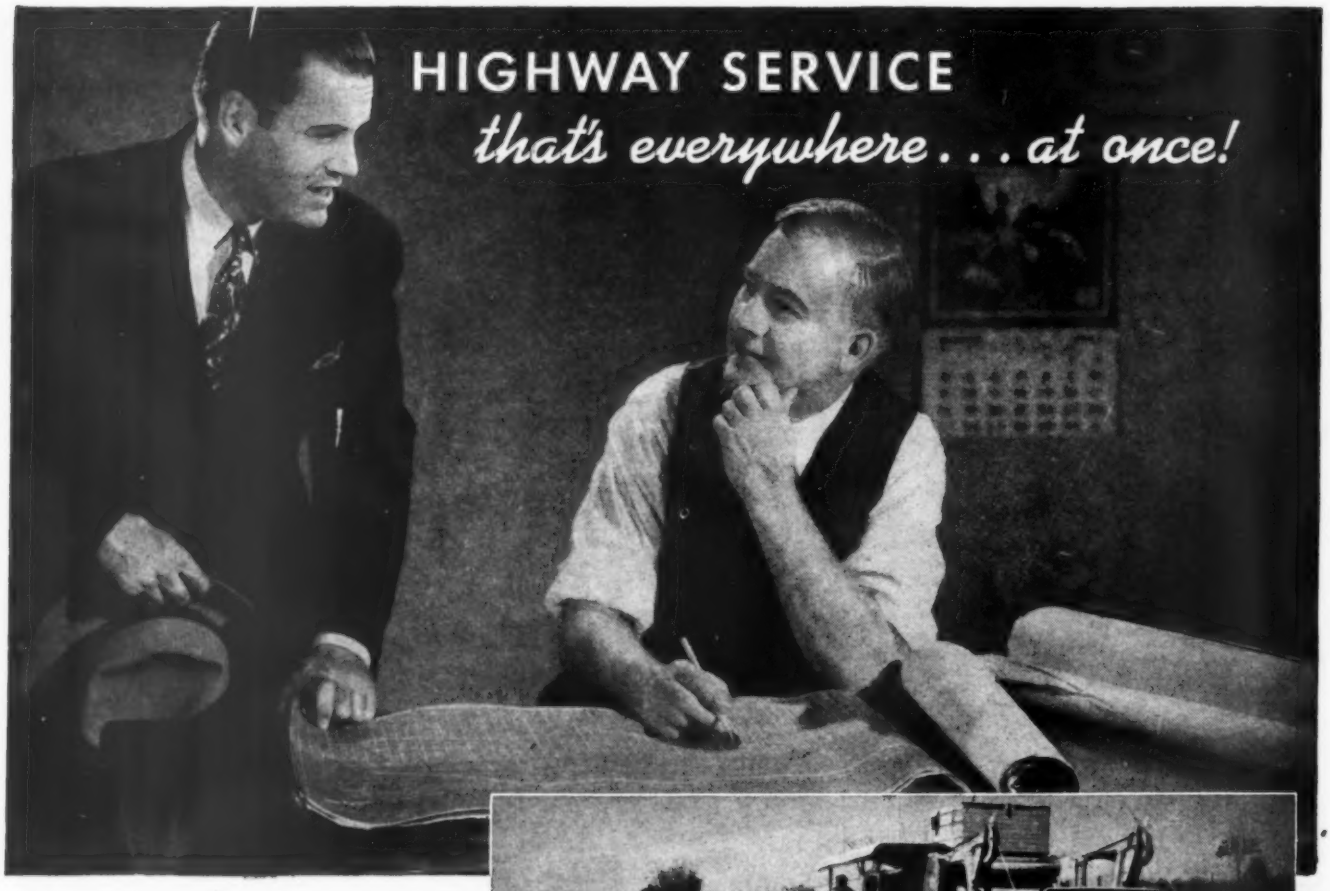


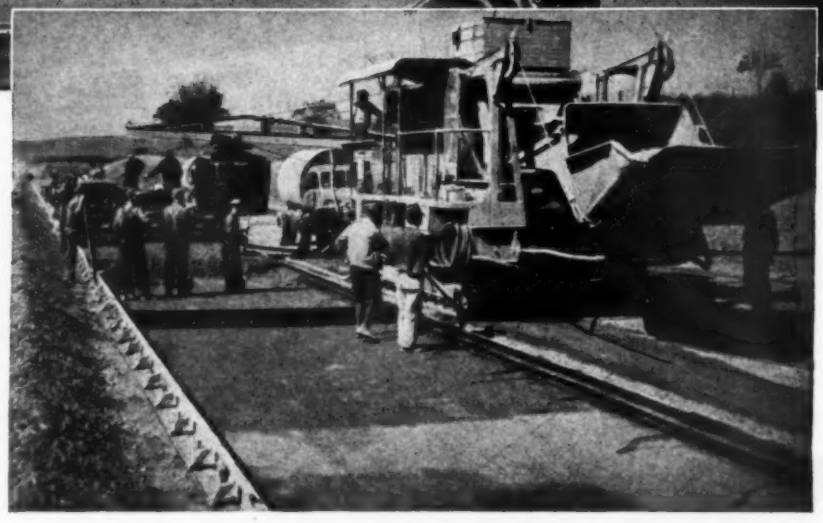
TRAXCAVATOR

REG. U. S. PAT. OFF.

THE ORIGINAL TRACTOR EXCAVATOR

DIGS GRADES LOADS CARRIES





ONE ORDER DOES IT ALL

You certainly streamline your road-building job when you specify Ceco Highway Products.

In the first place, wherever you are in America there's a Ceco office near you. A network of 22 service offices blankets the nation strategically. And every office has experts waiting to help you.

Then, in one complete order, you can specify everything you need for your job. Time—money—efficiency—all are saved. And Ceco products are tops, all the way from steel to Cecure curing compound.

Check the list of Ceco Highway Division Products at the right. Then write us for fuller details. Plan your postwar construction now. We'll put you in touch with our nearest office.

Here ROADBUILDERS, is your Check List of CECO Highway Products . . .

1. **Reinforcing steel**
2. **Welded fabric**
3. **Expansion and contraction joint: asphalt or fibre**
4. **Metal contorstrips**
5. **Load transmission devices**
6. **Cecure curing compound**
7. **Dowel bar supports, dowel sockets, stake pins**
8. **Subgrade paper**

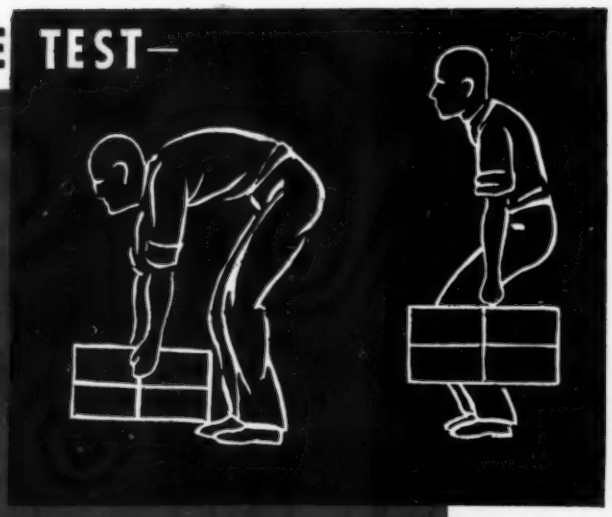
CECO STEEL PRODUCTS CORPORATION

***Highway Products Division*—5701 W. 26th St., Chicago, Ill.**

Manufacturing Division, Concrete Engineering Division, Sheet Steel and Wire Division

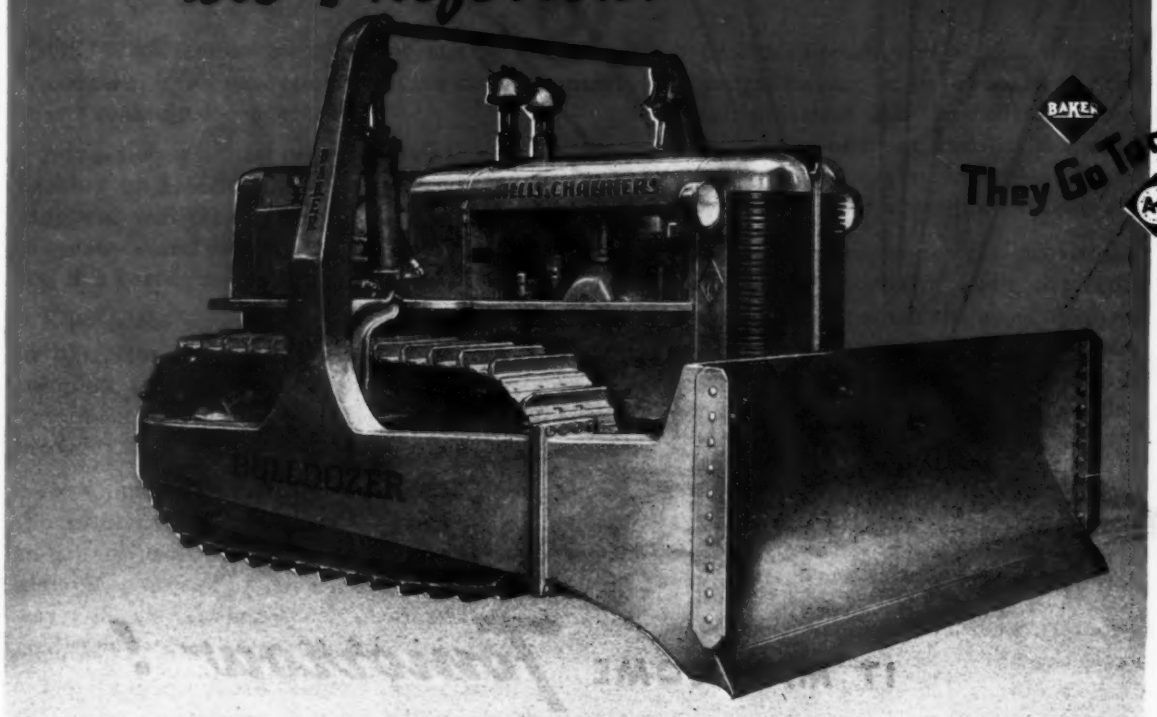
ENGINEERING MAKES THE BIG DIFFERENCE IN CECO CONSTRUCTION PRODUCTS

. . . . MAKE THIS SIMPLE TEST—



see why

BAKER *Hydraulic* BULLDOZERS *are Preferred!*



BAKER They Go Together AC

Place a suitcase or similar weighty object several feet in front of you. Bend over and pick it up at arms length. Puts a strain on the old back and gives the biceps a workout, doesn't it? Now place the suitcase at your side. Bend the knees, keeping your body erect, until you can grasp the suitcase handles. Comes up easy, doesn't it? You can lift a lot more this way, without straining your back, than you could at arms length.

Baker hydraulic Bulldozers operate on the same principle — the hydraulic cylinders work straight up and down, *direct and positive.* They lift the blade faster and can bring the full weight of the tractor front end to bear on the blade — no linkage lever losses — no "shooting around corners."

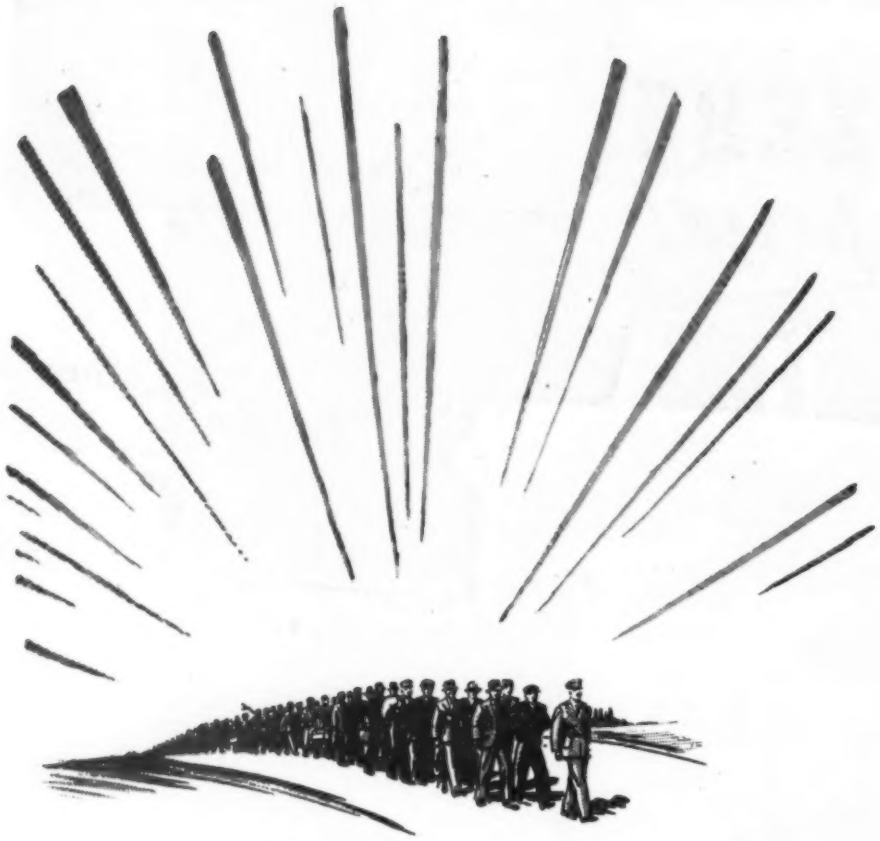
That's why Baker hydraulics outclass all comers for greater yardages per shift, lower operating costs and decidedly lower maintenance costs.

Keep your eye on the future. In the "sharp pencil" bidding to come after the war you will make greater profits with Bakers on your earth-moving jobs.

THE BAKER MFG CO.
506 Stanford Ave. Springfield, Ill.

BULLDOZERS SNOW PLOWS **BAKER** CONSTRUCTION EQUIPMENT

Is YOUR State



IT MAY COME *Tomorrow !*

Peace—and with it the problems of reconverting industry and reinstating 10 to 20 million persons in gainful, productive occupations. How is it to be done? By government support of the unemployed, with leaf-raking projects of no permanent value, and subsistence only for the worker? Or by planned, durable projects, of lasting economic value to the community, and providing man-size wages and a rising standard of living?

Don't write to your Congressman! Congress has done its part, for the moment. Write to your State, County and Municipal Officials. Insist that they organize, plan and participate in this sound, constructive program.

Ready with its PLANS?

ACT NOW—TO ASSURE VITAL POST-WAR HIGHWAY CONSTRUCTION PROGRAM—FIRST STEP TOWARD PROVIDING MILLIONS OF JOBS

POSTWAR employment is not merely a national concern. It is a state concern. It is a county concern. It is a municipal concern.

Adequately planned public works is a constructive backlog to America's future prosperity. Sound planning *now* will create barriers to mass unemployment tomorrow—and eliminate make-shift leaf-raking projects that cost money but do not create wealth.

Now is the time to get your public work projects in blueprint form. Now is the time to plan, with complete specificity, the Highways, Airports, Sewage Treatment and Water Purification Projects that will provide *productive* employment when it is *needed.*

How much work should be planned, how long it should be carried on, in order to achieve the desired ends, are questions receiving various answers in different places. The American Association of Highway Officials' estimates of construction needed immediately is over seven billions of dollars worth.

The American Road Builders' Association envisions an annual investment of three billions of dollars in roads, for an indefinite period. Events still to come will show what is actually necessary or practical, but a definite starting point, and a substantial portion of the work to be done immediately, are provided by the Federal Aid Highway Act of 1944. This measure contemplates a billion dollars worth of highways to be built each year, for three years. This will amount to a lot of roads, and will provide a lot of jobs. Larger programs may be in prospect, or needed to attain our full objective, but the Federal program will conflict with none of them, and has the merit of being ready to start as soon as individual States have prepared plans, and have appropriated their share of the funds.

Furthermore, under the provisions of the Federal Aid Highway Act of 1944, the Federal Government will defray one-half the costs of surveys and plans for highway construction for your State. Under these circumstances what State can afford not to participate? What reason is there for any state to delay the preparation of its plans?

Communicate with your State Highway Department at once. Make sure your State will be ready, when the day of Victory dawns, to carry on its share of this great and *vital program.*

American Road Builders' Association has issued informative booklets on the subject of road building in relation to national economic stability.

Highway Departments, Civic Groups, Commercial Clubs and individuals should study these, to be well informed on the full significance of this program.

Write for "The Road Ahead" and "Blueprint for Post-War Roads—and Jobs." Address, American Road Builders' Association, Washington, D. C. or Link-Belt Speeder Corporation, Chicago 9, Ill.

LINK-BELT SPEEDER CORPORATION

10080

CHICAGO 9, ILLINOIS • CEDAR RAPIDS, IOWA

BUILDERS OF THE MOST COMPLETE LINE OF CRAWLER AND WHEEL-MOUNTED CRANES, SHOVELS AND DRAGLINES FOR EFFICIENT LOW COST HANDLING OF MATERIALS IN THE INDUSTRIAL, EXCAVATING, CONSTRUCTION AND ROAD BUILDING FIELDS

SPEED · DEPENDABILITY · SAFETY · ECONOMY

... *with the* BROS TRACK PIN PRESS!

You need speed of operation. Only two to three hours are required to process even the longest set of tracks. You need dependability. Simplicity of design, yet extra rugged construction, has made breakdowns or stops for press repairs practically unknown. You must have safety. Tools don't shoot out of place because they are slightly mis-aligned. They fit snugly and safely in deep sockets in both the ram and buttress.

You want economical operation. Power consumption, whether electrical or gasoline, is kept at a minimum by automatic power shut-off. Further economy is effected by the practical absence of repair or maintenance cost.

This speed, dependability, safety and economy of operation is again proof that "You get the most from a Bros". Wm. Bros Boiler & Mfg. Co., Minneapolis 14, Minnesota.

BROS

FABRICATORS OF STEEL • BOILERS • STOKERS • TANKS • ROAD EQUIPMENT

POWER for Great Projects

PLAN *Now* FOR POWER FOR PEACETIME CONSTRUCTION

INTERNATIONAL HARVESTER

Great construction projects await final victory. There are airports, state and federal highways, bridges, dams to build. There are vast flood control, land clearing, and housing plans to be activated. All will require power of the kind that has made the name International famous.

Think now of International Power-TracTracTors, Wheel Tractors, and Power Units—in relation to your postwar plans. These tractors and power units, designed and built by International Harvester, come with both Diesel and carburetor-type engines and in sizes adapting them to a multiplicity of jobs. Into their design and construction goes the know-how that has made International Harvester the world's leading tractor producer.

Although civilian supplies are limited, *now* is the time to plan your postwar power set-up. Let the International Industrial Power distributor help you. He has the power that will be most useful and economical for you. And his service facilities are tops!

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL POWER

PROGRESS starts with Excavation

Excavating to help build a way of life . . . excavating to help destroy an enemy . . . the purpose and the operating environment are different — but the basic operations are the same. A road, for example, whether it carries the products of peacetime or the ordnance for offensives, is still a road. The same amount of dirt must be moved to build it!

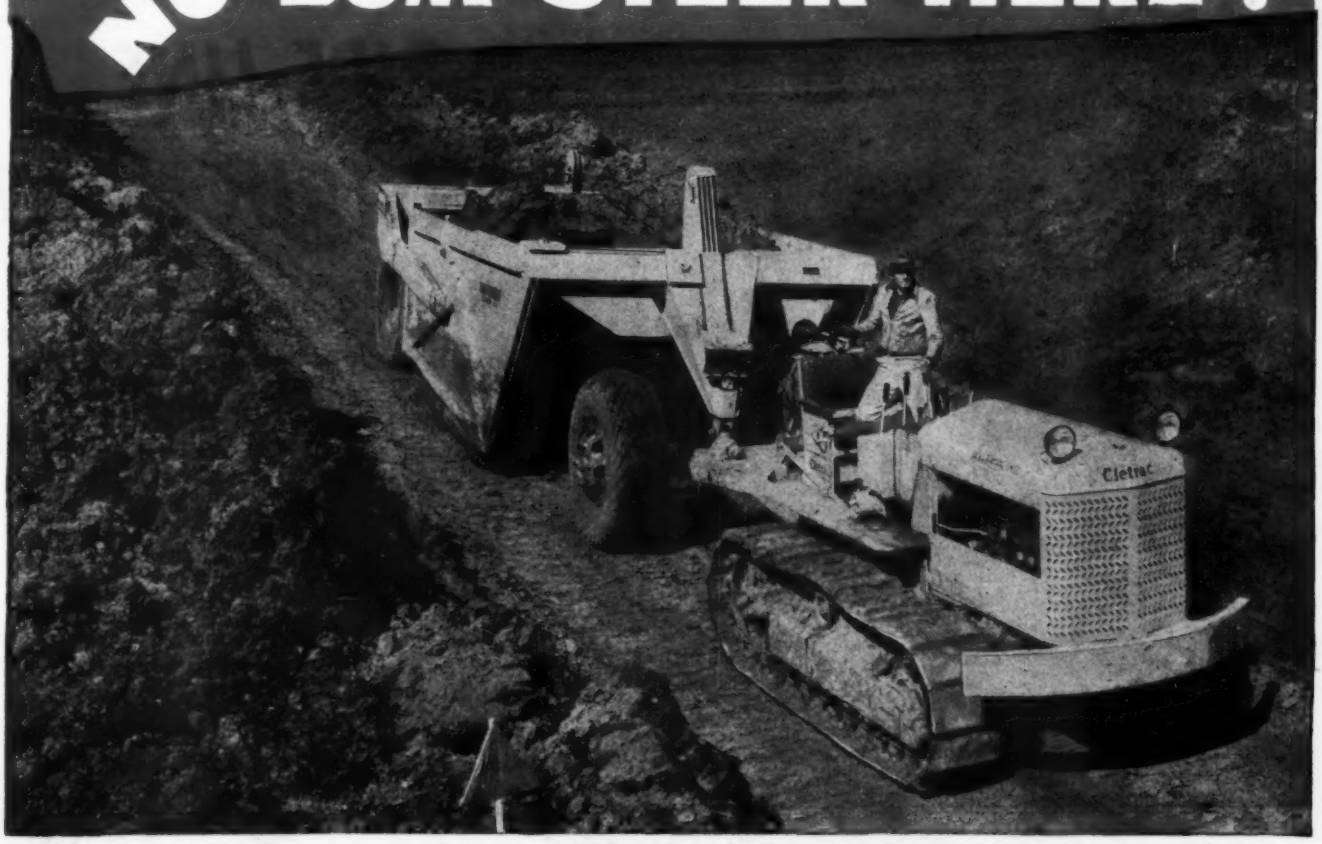
This new free 36-page booklet gives you the dramatic picture story of excavating in war and peace. It shows you, too, why the more than 3000 fighting Bucyrus-Erie excavators, as their peacetime counterparts have done yesterday and will do tomorrow, perform with an efficiency that makes them truly fundamental tools for progress.

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

Write for your free copy today!

25E45

NO BUM STEER HERE!



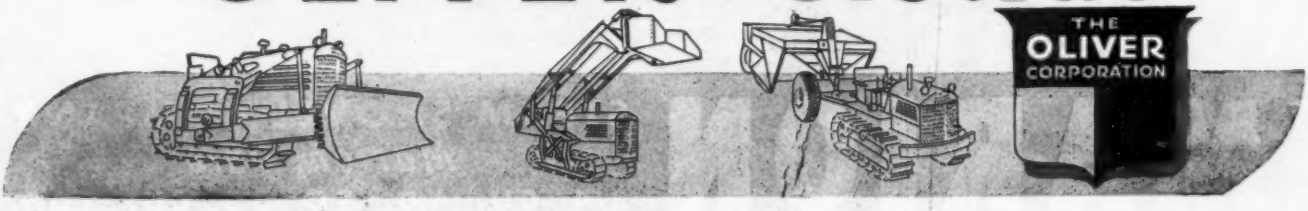
• When you're taking a heavy load downhill, you'll find that an Oliver "Cletrac" crawler tractor never gives you a "bum steer." To turn right, you pull on the right lever . . . to the left, pull on the left lever. Contrast this simple, easy steering with the ordinary tractors, where you have to "cross steer" in order to control the tractor under such conditions.

The smooth, positive control of Oliver "Cletrac" tractors is a result of their patented *controlled differential steering.* Power is never completely disconnected from either track even when turning. One track speeds up . . . the other slows down, assuring positive traction throughout the entire turn. The load cannot swing the tractor in the opposite direction. This exclusive steering assures greater safety on hills and slopes . . . eliminates operator confusion on downhill trips.

Oliver "Cletrac" tractors are ruggedly designed for long, dependable service. Completely built in the modern, well-equipped Oliver "Cletrac" plant, these tractors have no dead weight to reduce load capacity and create unnecessary strain. Majority of parts are either drop-forged or rolled steel. Tractors are designed for unusual accessibility, making maintenance and adjustment easy.

Substantial numbers of Oliver "Cletrac" tractors are now being released for essential use. Your Oliver "Cletrac" dealer will gladly assist you in making application for a new tractor. **The OLIVER Corporation,** Industrial Division, 19300 Euclid Avenue, Cleveland, Ohio.

OLIVER - Cletrac



MARION HAS THE ANSWER!

What is Your Material Handling Problem?

IS IT PIPE LINE CONSTRUCTION?

Construction will benefit materially from the billions of dollars now being set aside for post-war developments.

To meet the demand that will exist for proven equipment, MARION has a machine of the right size and type from ¾ cubic yard to 35 cubic yards. Put a fast, powerful MARION on that postwar job—then watch the rock and dirt fly! Let's discuss your problems!

THE MARION STEAM SHOVEL CO. • MARION, OHIO
SHOVELS • DRAGLINES • CRANES • PULL-SHOVELS
CLAMSHELLS • WALKERS • *from 3/4 cu. yd. to 35 cu. yds.*

There is a modern MARION pull-shovel of the right size for all types of water . . . sewer . . . and drainage pipe line construction. Let us help you with your problem.

MODERNIZE WITH

THE MARION STEAM SHOVEL COMPANY
Marion, Ohio
3/4 CU. YD. TO 35 CU. YDS.

For fast and positive action... full visibility... smooth performance ...easy adjustment... minimum maintenance ...insist on

HEIL "engine mounted" CABLE DOZERS

Heil Hi-Speed Cable Scoops give you fast, profitable dirt-moving at low cost.

Heil Hi-Speed Bottom Dump Wagon saves loading time — cuts hauling time — speeds dumping.

This cable-operated, "engine-frame mounted" Cable Dozer has the lifting mechanism mounted on the tractor engine frame to provide a direct overhead lifting operation. Designed through close cooperation with the International Harvester Co. engineering staff, it provides a perfectly balanced team that works as an integral unit.

The raising and lowering action of this unit is faster and easier to control for accurate blade setting. You get a higher lift of the blade which is particularly important in tree dozing, plus a drop that is practically unlimited. With Heil Cable Control there is instant response to movements of the control lever which enables the operator to inch the blade up or down, or to raise it rapidly for pitching action.

Heil design assures you of full benefit of all the power furnished by the tractor — more driving and penetrating power at the blade, and more "pay dirt" moved with each load. For full details and specifications —

B-51

Write for descriptive bulletin.

ARMY ★ E ★ NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

UNIT 357

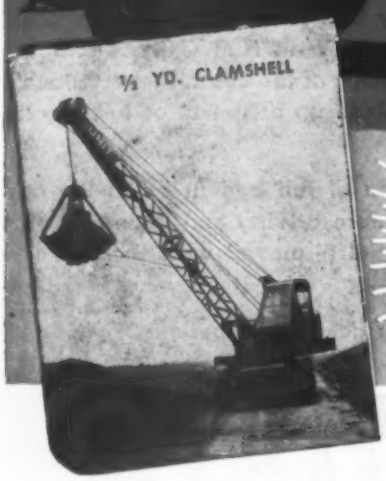
Self-Propelled MOBILE CRANE!

Here's a fast, mobile UNIT that rides on rubber . . . goes anywhere . . . over rough terrain or on paved highways . . . gets there in a hurry. Has the well-known UNIT power and stamina, plus motor truck speed and mobility. Operated by ONE man . . . powered by ONE engine . . . controlled from ONE position in cab. Ultra-modern in design, yet available at LOW COST. Ask for bulletin.

5-TONS
(7 tons with Outriggers)

New, Full Vision Cab—pioneered by UNIT—provides maximum visibility. Operator can see in ALL directions. Promotes safety. Increases efficiency.

FULL VISION CAB



UNIT CRANE & SHOVEL CORP. UNIT MILWAUKEE WISCONSIN

FULLY CONVERTIBLE TO ALL ATTACHMENTS

- SHOVEL
- DRAGLINE
- TRENCHOE
- MAGNET
- CLAMSHELL
- PILE DRIVER
- BACK FILLER

UNIT CRANE & SHOVEL CORP.
MILWAUKEE 14, WISCONSIN, U. S. A.

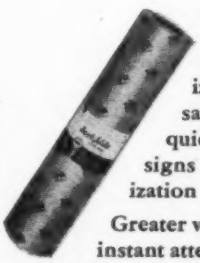
REDUCE NIGHT ACCIDENTS BY QUICKER REACTION TO HIGHWAY SIGNS . . . . .

*At 35 miles per hour, 122 feet are required to make a full stop . . .

At 45 miles per hour, 184 feet are required to make a full stop . . .

At 60 miles per hour, 314 feet are required to make a full stop.

*Reprinted by permission of the A. A. A. from tests conducted and published in SPORTSMANLIKE DRIVING



Highway signs and markers reflectorized with SCOTCHLITE are a positive safety feature for night time driving. A quicker reaction to all types of warning signs is possible through over-all reflectorization used in standard highway signs.

Greater visibility, both *day* and *night* that attracts instant attention. Brilliant reflection without glare that will give every motorist ample time to apply proper braking power or reduce speed.

SCOTCHLITE reflective material is manufactured in roll form and is simple to apply and easy to handle. It may be applied to signs and markers already in use thus making SCOTCHLITE an economical as well as outstanding safety feature in any well planned safety program. SCOTCHLITE is available *now* in colors of silver, white, yellow and red.

Standard Size Stop Sign—122 ft.

Standard Size Stop Sign—184 ft.

Standard Size Stop Sign—314 ft.

Write for Free Sample Swatch and Additional Information to:

3-M

MINNESOTA MINING AND MANUFACTURING CO.

GENERAL OFFICES: SAINT PAUL 6, MINN.
BRANCHES IN PRINCIPAL CITIES

because it digs, SWINGS, hoists and dumps in ONE continuous movement

FLEETFOOT
JAEGER LOADER
CRANE and EXCAVATOR

LOADS TRUCKS *3 TIMES FASTER*

This all-purpose Loader fills a long-felt need for contractors, highway depts., counties, municipalities, quarries . . . With 180° swinging boom and power-closing bucket it loads to either side in one continuous movement — with 11 fewer clutch moves, in ⅓ the usual time . . . NO MANEUVERING — WORKS IN TIGHT PLACES . . . Crowding power is tremendous — with 65 h.p. engine in ¾ m.p.h. low gear and 80% of load on giant front driving wheels it can dig into any material, backfill, grade, do prime moving and light excavating . . . And with 6 traction speeds and power steering it travels to job at 15 m.p.h.

Send for 52 page Catalog JL-5, showing a hundred year round uses and advantages.

½ to 2 Yd. Buckets — Handle Any Material from Rock to Snow.

12-25 Ft. Crane Attachment

Can Dig Outside Its Wheels

THE JAEGER MACHINE CO.

Main Office and Factory — Columbus, Ohio

REGIONAL OFFICES

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AIR COMPRESSORS, MIXERS, PUMPS, HOISTS, PAVING MACHINERY, TRUCK MIXERS—DISTRIBUTORS IN 120 CITIES

AIR Does the Work
AT A TOUCH OF THE FINGERS

With MICHIGAN Fingertip Air Controls

Hour after hour—in gravel, sand, clay or rock—operators of Michigan Mobile Shovel-Cranes maintain peak production with a minimum of fatigue. Michigan's Air Controlled Clutches are fast, smooth, positive. No cumbersome levers to push and tug, no rods, toggles or joints to become stiff with grease and dirt. Michigan's Air Controls are job-proven, both in civilian and in military use . . . . Unsurpassed operating speed and truck mobility, plus real stamina and balanced design, are combined in the shovel-crane that has proven "tops" in materials-handling.

3/8 yd. and 1/2 yd. shovels—convertible to crane, clam, dragline, trench hoe. 6, 10 and 12 ton cranes.

RS-85

MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN

THE BIG THREE MEET ON ROAD PROBLEMS

There are three of them, each keenly interested in ROADS: *The Taxpayer* is thinking of costs . . . *The Engineer* is pointing at better roads . . . *The Contractor* wants a better working mix.

Their individual aims are completely met in this revolutionary advance in paving materials . . . KOTAL MASTER MIXES!

Five years of severe tests have demonstrated the unique properties of this all-weather worker that is helping to produce roads of greatly increased toughness and durability . . . and paying handsome dividends in savings of time, labor, and money.

Check the unusual "Working Features" of Kotal Master Mixes as listed in the box. Then, write for the interesting booklet which will give the detailed story of exactly how these Mixes are being used by leading engineers. We'll gladly send this free booklet to you—also the name of your nearest supplier.

KOTAL COMPANY • 52 Vanderbilt Ave. • New York 17

MASTER MIXES KOTAL

EIGHT WORKING FEATURES OF KOTAL MASTER MIXES

EASY TO USE. Quickly mixed, ready to lay. No preheating or drying.

STABILITY. Cure quickly and permanently. Do not shift, ravel or pick up. Open sooner to traffic.

WORKABILITY. Do not adhere to equipment. Work easily.

LONG-TERM STOCK PILES. Can be stock-piled for many months without losing workability.

SAVE TIME. Quickly made stock piles ready for immediate use without frequent fresh mixes.

SAVE LABOR. Actual road records prove fewer labor hours required.

SAVE MONEY. Savings in time and labor mean economies in road costs.

EXTEND PAVING SEASON. All-weather workability permits more months of operation.

KOTAL *Master Mixes*

THE ADVANCED ALL-WEATHER AID IN BUILDING BETTER ROADS

IT'S DOWNHILL WORK WITH A WARCO

Around The Earth
WARCO is Best!

You may not always have the tug of gravity in your favor, actually, but when you have the right combination of design, construction and control which the WARCO engineers have been building into their graders for years – it seems more like a "downhill" job.

Ever examine the key features of a WARCO grader?

- FULL HYDRAULIC POWER CONTROL
- SINGLE MEMBER FRAME (electrically welded)
- ENGINE OVER AXLE POWER UNIT
- REVERSIBLE BLADE
- UP TO 90° MOLDBOARD ANGLE FOR BANKSLOPING
- TANDEM DRIVE (chain driven)

These and many other features will sell you too, on a WARCO! It's a member of a famous family.

W.A. RIDDELL CORP.
BUCYRUS, OHIO, U. S. A.

DO IT *Better-Faster!*

WELLMAN
Williams BUCKETS

You get better performance . . . more dependable performance from Wellman buckets—they're welded rolled steel construction. Sturdier, less breakage.

SEND FOR BULLETIN

THE WELLMAN ENGINEERING CO.
7003 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities

Developed by demand, with actual working requirements dictating design, this worthy companion to the now famous Model 2-S possesses important improvements. Heavier, sturdier, with interfering braces and supports eliminated, the 4-U sends sand, salt, cinders or chips through a free and uninterrupted spread of 270 degrees.

Capable of handling an amazing variety of jobs, the 4-U is equally at home working on a single traffic lane or a vast airport runway. It spreads up to 25 feet at 10 miles per hour with spread width controlled by truck speed and adjustable deflector plates. Good Roads has engineered completely controlled coverage into the 4-U, and it will do a splendidly complete spreading job for you. Write for folder No. 108.

IMPROVED HITCH AND TRUCK ATTACHMENT

This new hitch swings in an arc and is adjustable to any desired position while the truck attachment remains fixed.

Good Roads MACHINERY ESTABLISHED 1878

GOOD ROADS MACHINERY CORP.

Kennett Square • Pennsylvania

GOOD ROADS BUILDS CHAMPIONS

THE INSIDE STORY OF A FIGHTING PUMP

A CITATION — AND A FURTHER PLEDGE

Barnes has just been awarded its third Army-Navy "E" Star — a citation for a continuous job well done. Barnes Automatic Centrifugal Pumps have seen duty on all fronts—the African, the European, the Pacific—duty teeming with formidable tasks, successfully completed. And Barnes war production facilities are still pledged to final victory in the battle of the Pacific.

Careful company planning and allocation of production, throughout the European conflict, made possible equitable serving of distributor pump needs on the home front. However, requirements of the Services are becoming less severe, and an increasing number of Barnes Pumps are now available for distributors and their customers.

In every service, on the battle front or on the home front, Barnes Pumps will deliver *more gallons of water for your pumping dollar!*

ATTENTION DISTRIBUTORS! *A number of territories are still available. Write, wire or phone.*

BARNES MANUFACTURING CO.

Quality Pump Manufacturers for 50 Years MANSFIELD, OHIO

TEAMED *for Super Service*

A HYDRAULIC HOIST THAT GIVES YOU - -
- Speedy, powerful action
- Safe, dependable operation
- "Cushion-Drop" shock eliminator
- Long-lived usefulness

A DUMP BODY THAT GIVES YOU - -
- Extra strength and durability
- Quick, easy mounting
- Convenient operation
- Scientific load distribution

Write for Bulletin and names of nearest Distributors.

ARMY E NAVY 5TH CITATION FOR WAR PRODUCTION

THE PERFECTION STEEL BODY CO. GALION, OHIO

PERFECTION

TRUCK BODIES AND HOISTS

.... Stores hydraulic energy
Absorbs shocks

BENDIX ACCUMULATOR

(SURGE CHAMBER)

The Bendix Accumulator accomplishes two important functions in an hydraulic system—it stores energy to provide an instantaneous supply of high pressure fluid—it acts as a surge chamber to absorb pressure impulses and eliminates hydraulic shocks thrown on the system. In addition, it provides hydraulic pressure when the pump is not running.

Bendix engineers have utilized the utmost in the inherent stress efficiency of a spherical shell. The shell is continuous past the equator. This means that stress is not carried in an offset location, bending moments are avoided and flanges are entirely eliminated. This design has demonstrated its trouble-free superiority in more than 65,000 separate installations. In all installations Bendix Accumulators have improved the efficiency of the hydraulic system—absorbed hydraulic shocks, smoothed out pulsations and increased pump life.

The Bendix Accumulator is available in 5" and 7½" sizes for both low and high pressure systems. Low pressure shells have a bursting strength of 6000 PSI; high pressure shells 12,000 PSI. All units are furnished with ⅜" pipe threads.

Write Pacific Division for complete data, or for engineering assistance. Please indicate type of installation contemplated.

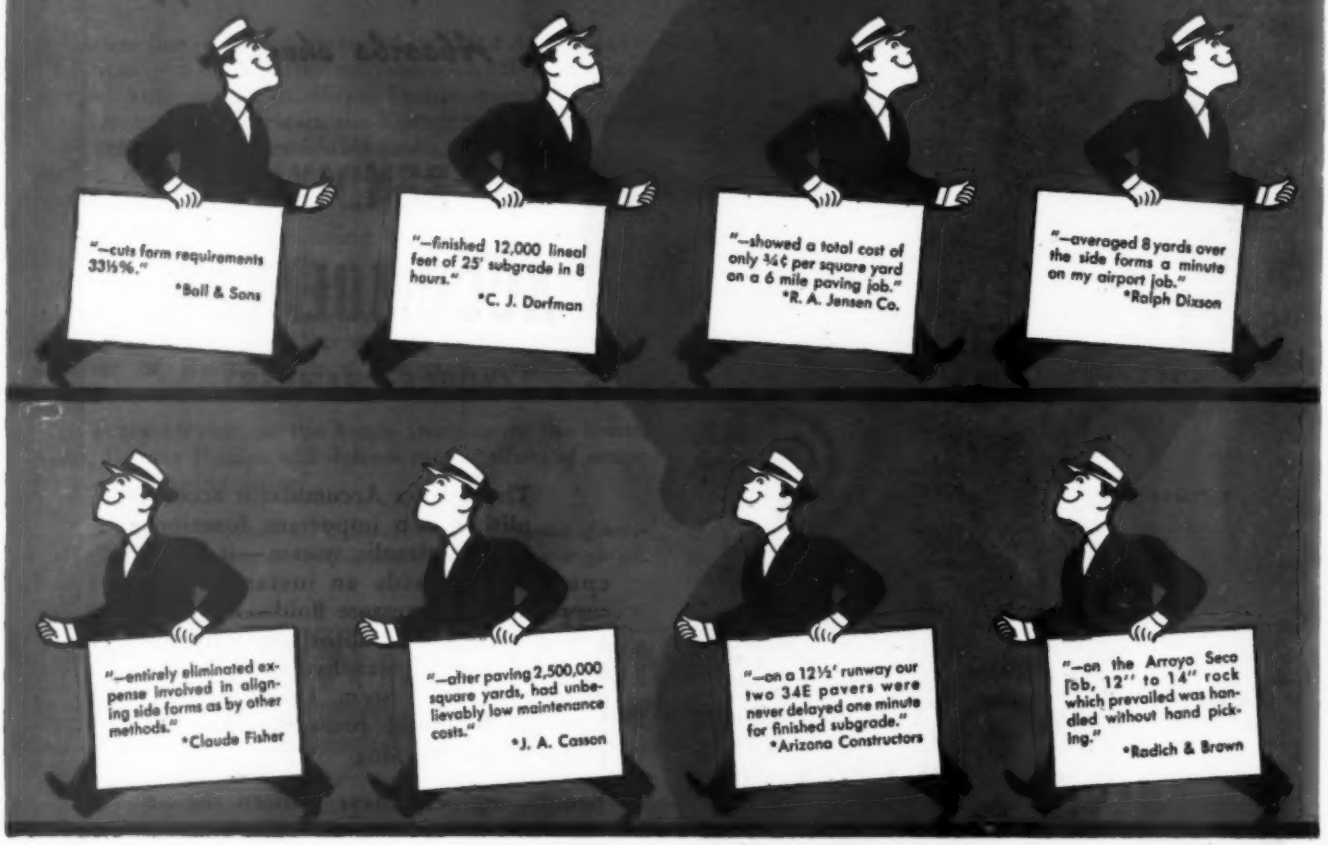
Oil and air are separated by a flexible bladder. The oil is charged through the oil port, compressing the air in the bladder and absorbing hydraulic shocks. As an accumulator, this oil is released under pressure for system used.

© 1945, Bendix Aviation Corp.

Pacific Division
Bendix Aviation Corporation
NORTH HOLLYWOOD 7, CALIF.

• MANUFACTURERS OF A COMPLETE LINE OF HYDRAULIC EQUIPMENT FOR INDUSTRY •

Contractors are our best salesmen!


"—cuts form requirements 33⅓%."
*Ball & Sons
"—finished 12,000 lineal feet of 25' subgrade in 8 hours."
*C. J. Dorfman
"—showed a total cost of only ¾¢ per square yard on a 6 mile paving job."
*R. A. Jensen Co.
"—averaged 8 yards over the side forms a minute on my airport job."
*Ralph Dixson
"—entirely eliminated expense involved in aligning side forms as by other methods."
*Claude Fisher
"—after paving 2,500,000 square yards, had unbelievably low maintenance costs."
*J. A. Casson
"—on a 12½' runway our two 34E pavers were never delayed one minute for finished subgrade."
*Arizona Constructors
"—on the Arroyo Seco job, 12" to 14" rock which prevailed was handled without hand picking."
*Radich & Brown

Every owner of a STANDARD - LEWIS subgrader says *unreservedly* that it excels in every way

Here are a few reasons why:

The Standard-Lewis subgrader is designed with a sectional stationary cutting blade (adjustable to any desired subgrade contour) on each side so that grading may be done in either direction without turning machine or time consuming "pull backs." It can be raised by power to pass over manholes, culverts and other obstructions, while in operation. Wheels may be turned 90° to permit towing by truck or tractor over bridges or through narrow places. Many other features make it the one subgrader designed to meet postwar requirements for better, faster paving.

GET THE WHOLE STORY— SEND FOR THIS BULLETIN

STANDARD STEEL CORPORATION

General Offices and Plant: 5001 South Boyle Avenue
Los Angeles 11, California

Distributors throughout the United States and Canada

***Space will not permit full addresses which will be sent on request.**

WE'LL BE READY, WILL YOU ?

Are you preparing to meet the keen competition that is predicted once the tremendous post-war construction boom gets underway? It's not a moment too soon to be thinking about the new rig you'll need . . . dependable, economical equipment that will turn in a profit on every job.

We'll be ready to fill your requirements with the most complete line of construction and excavating equipment ever to bear the century-old Osgood name. The same engineered design and precision construction, that have always characterized Osgood equipment, are applied to more than a dozen Osgoods from 3/8 to 2½ yards capacity.

We'll be ready, too, with new and improved Mobilcranes, likewise equipped with every improvement in design and manufacture that wartime work has uncovered. Whatever your post-war needs, you'll find the answer in an Osgood . . . "proved in world-wide service."

THE GENERAL EXCAVATOR COMPANY
CRANES, DRAGLINES AND SHOVELS
DIESEL, GAS, ELECTRIC

Associated with The General Excavator Company

OSGOOD

THE OSGOOD COMPANY • MARION, OHIO

ARMY E NAVY

OSGOOD
SHOVELS, DRAGLINES
CRANES

ROGERS GIRDER TYPE

the BETTER trailer for your BIGGER hauling jobs

THIS trailer, designed by Rogers Brothers to meet low headroom conditions, has been used for some time in certain sections of the country. Now, because of the larger equipment in use, it is coming into extensive use elsewhere.

ROGERS BROS. CORPORATION

110 Orchard St. Albion, Pa.

TUTHILL

Puts Safety-first!

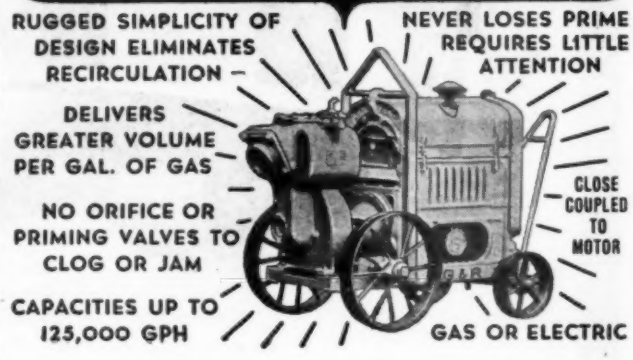
ON GUARD along the nation's highways, TUTHILL Guard is doing a real service . . . saving lives . . . conserving property . . . lowering installation and maintenance costs. Strong, steel, convex panels, steel-braced with heavy springs, deflect cars, absorb impact, reduce danger and damage. *Request complete details.*

Pacific Coast Manufacturers and Distributors: U. S. SPRING & BUMPER CO., Los Angeles, Calif.

TUTHILL SPRING COMPANY

761 W. POLK ST., CHICAGO 7, ILL.

Streamlined Inside for Higher Efficiency and Lower Operating Costs

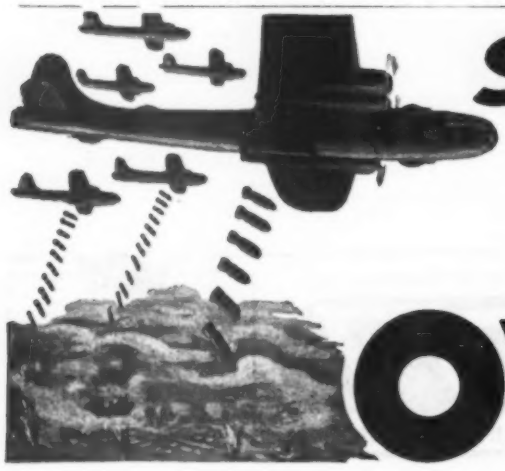

RUGGED SIMPLICITY OF DESIGN ELIMINATES RECIRCULATION
NEVER LOSES PRIME REQUIRES LITTLE ATTENTION
DELIVERS GREATER VOLUME PER GAL. OF GAS
NO ORIFICE OR PRIMING VALVES TO CLOG OR JAM
CLOSE COUPLED TO MOTOR
CAPACITIES UP TO 125,000 GPH
GAS OR ELECTRIC

Streamlined where it counts, you can't clog a Gorman-Rupp Self-Priming Pump. Unequalled in rugged efficiency, gallonage or continuous hours. A size and type for every need.

THE GORMAN-RUPP COMPANY, MANSFIELD, O

GORMAN-RUPP

SELF-PRIMING CENTRIFUGAL PUMPS



SUPER-PERFORMANCE

Like that of the B-29, Owen superiority is based upon a thorough knowledge of the problem, expert designing and precision manufacturing from the most appropriate materials available.

The OWEN BUCKET Co.

6070 Breakwater Avenue, Cleveland, Ohio

Branches: New York Philadelphia Chicago Berkeley, Cal.

OWEN BUCKETS

A MOUTHFUL AT EVERY BITE

For the first time in four years a few Huber Rollers earmarked for "civilian use" are now leaving our plant . . . although our production facilities are still devoted for the most part to war work. These 1945 Hubers measure up in every respect to the pre-war Hubers still in service and to the wartime Hubers which helped knock out Germany and are now contributing to our successes in the Pacific. You'll find them long-lived, dependably powered, economical to operate and keep in service.

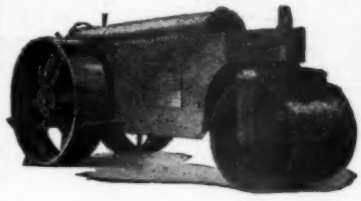
THE HUBER MFG. COMPANY ● MARION, OHIO, U. S. A.

HUBER ROLLERS

REGRADING—REPAIR—MAINTENANCE

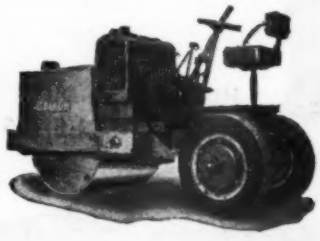
These two views show a Galion motor grader doing some important street work in Ohio. This past winter was tough on streets and now is the time to get them in shape for that heavy traffic when war is done. This big, modern grader will help you do just that—has the speed, power and stamina to do any number of jobs to your complete satisfaction. Investigate.

The Galion Iron Works & Mfg. Co.
Main Office and Works: Galion, Ohio
Distributors in Most Large Cities



ROLLING

A Galion Tandem and a Galion Portable Roller are pictured here. The former for heavy rolling and the latter for patch work and general maintenance. No city can afford to be without one of these rollers which do so much for so little. Also 3-wheel rollers. Get our latest catalogs covering the Galion line of graders and rollers.



Here Today (Producing 1,026-tons aglime, daily average)

Day after day this versatile Universal portable crushing plant turns out 100 to 114-tons of aglime for L. T. Renner of Rock Falls, Illinois. With a simple 15-minute adjustment both aglime and road rock can be produced without changing the screens. Plant consists of a 546-P primary crushing unit with 20" x 36" jaw crusher and 36" x 8' apron feeder, secondary pulverizer, 4' x 12' double deck screen, 3 compartment bin (lime, rock and surge compartments), conveyors.

gone tomorrow! (Moved on a moment's notice).

With all the ruggedness and stability of a lifelong permanent installation, this Universal engineered plant can be quickly moved to a new location. Primary and secondary units and bin with screens are built on chassis, on which pneumatic-tired wheels are readily installed. Renner gets flexibility of product, lowest cost per yard of finished material and mobility of entire plant. Send for further facts.

Photos courtesy Eighmy Equipment Co., Rochelle, Ill.—another "live wire" Universal dealer!

UNIVERSAL ENGINEERING CORPORATION

630 C Ave. West, Cedar Rapids, Iowa

ARMY E NAVY

UNIVERSAL

ROCK AND GRAVEL CRUSHERS, CRUSHING ROLLS, HAMMER MILLS, COMPLETE CRUSHING AND SCREENING PLANTS, WASHING PLANTS, ASPHALT PLANTS, SPREADERollers.

PATTERN FOR PULLING POWER

THE RIGHT TIRE FOR EVERY JOB

HARD ROCK LUG
for all rock work

ALL-WEATHER EARTH-MOVER
for drawn vehicles

How much you haul — and how fast — is what sets the pace for profit on your construction jobs. So drive-wheel tires *must* grip and pull to keep today's bigger yardages moving on schedule.

That's the prime reason why more and more contractors buy Goodyear Sure-Grips for their drive wheels. For this great worker is powered with Goodyear's *open center* tread that gives each husky cleat an entering edge all along the center of the tread. That permits the whole of each lug to dig in deeper and cleaner, take firmer hold in the ground and provide steady, maximum traction under all conditions.

And with no closed corners to trap mud, it's a *true* self-cleaning tread. Those wide, unblocked channels sluice out dirt, mud and stones and leave the sturdy lugs free and clear to bite deep and pull better every time.

Now superarmored with Goodyear's patented Rayotwist cord — *which makes the strongest body we've ever used in a work tire* — these really tough huskies are the finest off-the-road tires that can be built from today's synthetic and permissible natural rubber.

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GOODYEAR

BUY MORE WAR BONDS — BUY FOR KEEPS

ROADS AND STREETS

August, 1945, Vol. 88, No. 8

Triple Push Loading Speeded Minnesota Grading Job

Highlights of 8-mile belt line project near Minneapolis, where A. Guthrie & Co. moved 1,000,000 cu. yd. at prewar prices and postwar pace

PROJECT: 7.88 mile section of Minnesota Trunk Highway 100, linking Belt Highway northwest of Minneapolis; needed as war industry access road. Federal-aid project. M. J. Hoffman, commissioner, O. L. Kipp, chief engineer, H. E. Chard, district engineer directing construction; G. F. Welch, project engineer, Minnesota department of highways.

Contractor: A. Guthrie & Co., Inc., of St. Paul; W. R. Howard, superintendent.

Contracts included two adjoining clear-grub-grade-drain sections of 4.0 and 3.88 miles, two small bridges, a railroad underpass and a 730-ft., 7-span bridge over the Mississippi River (above navigation). Contract awarded in October, 1944, on lowest combined bid of $733,332—see breakdown of three lowest bids on page 64.

H. E. Chard, district engineer, Minnesota department of highways; M. E. Fish, grading inspector; H. A. Griffiths, Guthrie's grading supt.; G. F. Welch, project engineer. (Right) O. L. Kipp, deputy commissioner and chief engineer, Minnesota. (Not shown are project engineers Dwight Burns and Walt Nitarde)

Roadway consists of a new location through rolling terrain; right-of-way purchased for ultimate 4-lane divided highway; one side to be paved in near future; 1½ miles graded for 4 lanes in order to install structures, remainder of contract graded only 40 ft. wide under present contracts. The roadway is to be stabilized full width to a depth of 4 in., using .04 cu. yd. of fine binder soil and 2 gal. water per sq. yd. Traffic will be served by a temporary gravel surface consisting

Three—count 'em!—pushers, and sometimes there were four behind Guthrie's 22 and 25-yd. scrapers. "Not three unskilled laborers on this whole job," commented the project engineer. Skilled labor was utilized in place of common on much work because of scarcity of latter.

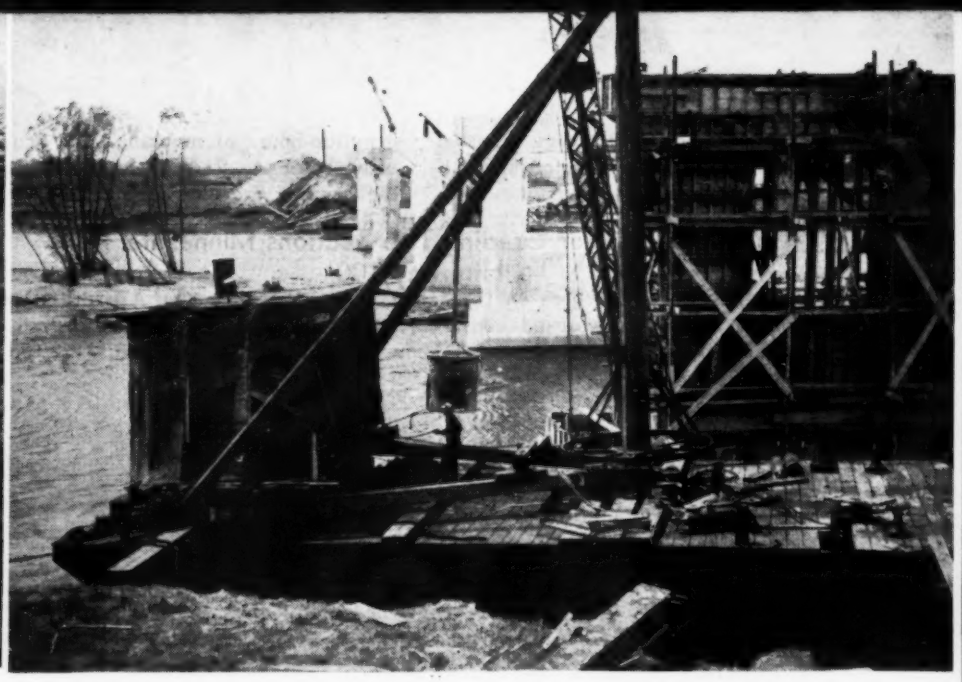
Powdery sand — 25-yd. heaped loads. Two pushers walked right through this fine material, which screened 40% passing No. 40

(Right): T.&g. concrete pipe was held securely together by the use of 1/8x10-in. galvanized iron bands. Note welded angle-iron flanges for the three tightening bolts. Asphalt coating was applied before placing bands, a second coat after tightening

While the drainage line was waiting to be backfilled it was partially closed by end plugs having small opening to carry away ground water without sand infiltration

(Right): All this wide trench just to get 22 ft. down for laying 4000 ft. of 24-in. concrete drain for an underpass. Contractor figured it was cheaper (also safer) than ditching and shoring

Showing usual Minnesota practice of draglining muck from one side of a swamp area while dozing sand replacement fill material forwar and rolling up muck from the other



(Left): This settlement of freshly placed swamp fill occurred within a period of two minutes as heavy scrapers packed it down. Already 3 ft. above the swamp level, the fill was carried several feet higher before rolling began. (Right): Seven-span 750-ft. deck girder bridge under construction across the Mississippi River near Minneapolis—one of the 1945 Guthrie contracts

of 1200 cu. yd. of material per mile of 32-ft. width, stabilized with 1 lb. of calcium chloride per sq. yd.

Clearing and Grubbing Methods: New in Minnesota practice was Guthrie's use of an 11-h.p. gasoline-engine-driven 2-man saw as an answer to the labor shortage. No blasting was employed, all trees being cut 6 in. from the ground and stumps dozed out where fill was less than 3 ft. deep. Some 300 heavy trees and extensive brush were cleared.

Grading. The bulk of the 1,000,000 cu. yd. was handled by one 25-yd., two 22-yd. and four 15-yd. tractor-scraper units. Three old-type 8-yd. tractor-drawn scrapers were pressed into service on longer hauls. The machines were broken up into two or three outfits or worked together, as day-to-day working conditions and haul distances suggested. A feature of the job management was the skill shown in the use of heavy diesel push tractors and assisting dozers to get out the yardage, which ran as high as 12,000 cu. yd. per 20-hour day.

The 3.88 mile contract, calling for 532,570 cu. yd. went for the remarkably low dirt price of 18 cents. On the other contract, covering 462,500 cu. yd. on 4.00 miles, the bid was 24 cents, this section involving 4600 ft. max. haul and fairly large (14,000 to 20,000 cu. yd.) balance areas with 1200 ft. max. distance between points. The largest hill cut was 130,000 cu. yd. and another 236,000 cu. yd. came out of the railroad underpass cut in a distance of 800 ft.

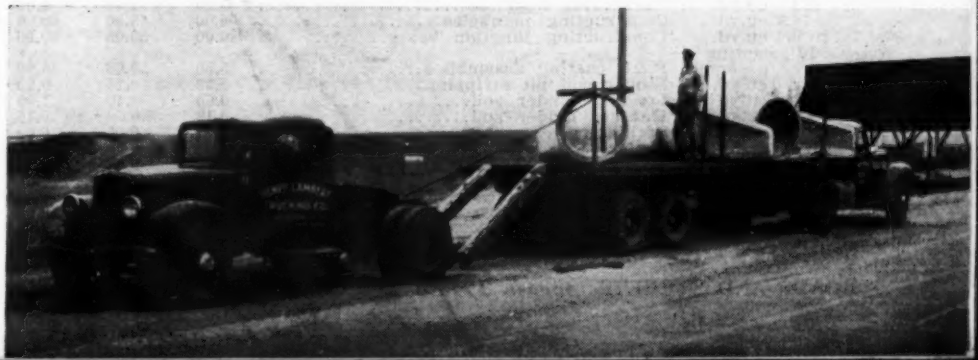
Unusual Pusher Operation

Double-pusher operation was standard, both in the fine alluvial sand usually involved and in the one bad clay cut. But three pusher-equipped tractors and a dozer often got in line behind the scoops in carrying out the general rule of "all tractors doing something all the time." The push tractors were all operated with transmission gears reversed for speedy back-up and more powerful pushing. On the larger cuts the four machines worked some of the time in a circle, more often backing shuttle fashion, two, three or even all four machines assisting on some part of the load path. At other times, as a result of informal teamwork among pusher operators, two, three or even four loaded scrapers would come out of the cut abreast.

Much "dinner bucket" discussion hinged on the value of this extra pushing, but both in sand and in stiff clay (which some contractors would have rooted) three pusher units loaded the 22 and 25-yd. pans faster and with noticeably less stalling, bucking and slipping than when two tractors were used. Usually the first pusher actually aided on 90-100% of the load path, the second and third machines somewhat less due to the time to fall in and connect. The dozer, when it assisted as a fourth unit, usually had time to exert a push along only 25 to 50% of the distance. It was a great tribute to the stamina of the scrapers represented that they stood up under this terrific nudging. (It is understood that the manufacturers as well as many equipment owners frown on use of more than one pusher as "too much of a good thing.")

Patented Minnesota-built culvert end section of a type used on this project. Saving in headwall costs, one advantage reported

Special flared-end culvert sections were skidded off the trailer with a winch line



Swamp Removal: Passage of the road across a small lake and several swamp areas necessitated some 1130 dragline-hours of mucking. The usual Minnesota practice was followed of bailing out and side-casting as much muck material as possible from one end while scrapers and dozers worked new fill forward from the other end, the new material displacing and rolling the muck upward toward the dragline. Sheepsfoot rolling began after the fill had been raised three feet or so above the water line and a degree of stability had been reached. Borings were taken at specified intervals and the swamp fill cross-sectioned before final acceptance.

Underpass Problem: The decision was made to carry the road under rather than over a Soo Line railroad track in order to get needed excavation yardage to help balance the extensive swamp fills. In going under, however, a bad drainage problem was encountered. A 4000-ft. line of 24-in. concrete pipe leading to a drainage ditch was installed to help hold ground water down, this line being tapped by parallel lines of 6-in. perforated corrugated metal pipe. The main pipe line was set about 22 ft. below prevailing ground surface. In installing pipe in advance of roadway grading and excavating for the underpass, contractor elected under a per-lineal-foot bid to open a wide drag-line trench rather than attempt to shore a ditcher trench in the sandy soil. Pipe was cradled on wood sills spaced three under each 6-ft. in length.

Of interest is the contractor's use of ⅛x10-in. iron bands at tongue-and-groove pipe joints in absence of bell and spigot, in order to give the pipe line plenty of "beam action" for resistance to undercutting or shifting of the sandy soil during construction operations. The bands were set in asphalt paint, which was applied just before the pipe was placed, the joints being given a second buttering after the bolt flanges were tightened.

Also because of the water table problem, the road grade into the underpass was increased from the desired 0.6% to 2.5% maximum, bringing the road up more quickly so that only about 400 ft. of line came below the water table. Well points were installed at intervals for a distance of 1400 ft. along the pipe line ditch. No pumping was attempted, the points being capped and used only for weekly observation of the ground water level. This measure was taken principally because of fears felt by owners of rich adjacent truck farms that the project would lower the ground water sufficiently to endanger crops. These fears were dispelled when the water table, after dropping slightly, promptly rose to a satisfactory level after the trench was backfilled.

Additional points of interest on this project are given under the accompanying photos.

Unit Price Bids for Grading Two Sections Minnesota Trunk Highway 100

The three lowest bidders on the 3.88 mile section were (1) A. Guthrie & Co., Inc., $147,174, awarded contract; (2) Megarry Bros., $159,273; (3) Nelson, Mullen & Nelson, Inc., and Leon Joyce & M. G. Astleford, $172,105. The unit price bids were as follows:

Approx. Quantities	Unit	Item	(1)	(2)	(3)
13.5	Acre	Clearing	$100.00	$200.00	$125.00
56	tree	Clearing	5.00	5.00	5.00
9.8	acre	Grubbing	60.00	150.00	125.00
29	tree	Grubbing	5.00	5.00	5.00
50	hours	(Man) partial clearing	1.30	1.25	1.25
10	hours	(Team, teamster) partial clearing	1.50	2.00	3.00
4	hours	(30 h.p. tractor) partial clearing	8.00	3.00	5.00
532,572	cu.yd.	Class "C" excavation	.18	.19	.23
9,280	cu.yd.	Top soil covering in place	.40	1.00	.60
282	hours	(Dragline) spec. swamp ex.	10.50	10.00	9.00
62	hours	Rental of bulldozer	9.00	7.00	6.00
385	cu.yd.	Hand ditch excavation	1.00	1.25	1.00
209	lin.ft.	Removing port. cul.	1.00	.60	.50
528	lin.ft.	Removing guard rail	.10	.10	.05
30,306	sq.yd.	Area sodding	.24	.35	.30
124	cu.yd.	Sand-gravel backfill	3.00	1.50	1.50
254	lin.ft.	Furn. & inst. 6" tile drain	.40	1.50	.50
97.4	cu.yd.	Conc. eros. control struc.	40.00	40.00	30.00
25	cu.yd.	Hand placed riprap	3.50	5.00	5.00
2	marker	Project markers	3.50	5.00	10.00
5,354	cu.yd.	Stabil. gravel in place	2.14	1.75	1.65
107	m.gal.	Water	6.60	3.00	4.40
20	m.g.hr.	Maint. completed work	6.60	5.00	6.60
52	ton	Calcium chloride	33.00	28.00	27.00
767	cu.yd.	Load binder soil	.82	1.00	.70
1,655	cu.yd.mi.	Hauling binder soil	.20	.20	.20
19,201	sq.yd.	Stabilizing	.09	.05	.06
39	m.gal.	Water	6.60	3.00	4.40
340	lin.ft.	Furn. & inst. 8" c.m. cul.	1.10	1.25	2.00
212	lin.ft.	Furn. & inst. 15" s.c. cul.	2.20	2.00	2.00
293	lin.ft.	Furn. & inst. 18" s.c. cul.	2.75	2.50	2.25
762	lin.ft.	Furn. & inst. 24" s.c. cul.	3.85	3.50	3.50
105	lin.ft.	Furn. & inst. 30" s.c. cul.	5.70	5.00	8.00
400	lin.ft.	Furn. & inst. 36" s.c. cul.	7.50	6.75	6.50
325	lin.ft.	Furn. & inst. 48" s.c. cul.	10.65	10.00	10.00
9.4	cu.yd.	Grade "A" concrete	40.00	60.00	40.00
830	lb.	Reinforcement bars	.10	.10	.10
31	cu.yd.	Class "U" excavation	5.00	5.00	2.00
1	l.s.	Removal old struc.	10.00	50.00	25.00

On the 4 mile section the three lowest bidders were (1) A. Guthrie & Co., Inc., $228,561, awarded contract; (2) Carl H. Peterson & Co., $265,934; (3) Megarry Bros., $270,329. The unit price bids were as follows:

Approx. Quantities	Unit	Item	(1)	(2)	(3)
3.6	acre	Clearing	$100.00	$100.00	$200.00
159	tree	Clearing	5.00	4.00	5.00
4.9	acre	Grubbing	60.00	150.00	150.00
263	tree	Grubbing	5.00	6.00	5.00
16	lin. ft.	Remove port. cul.	1.00	3.00	0.75
1.4	cu.yd.	Remove masonry or conc. struct.	5.00	30.00	10.00
215	lin.ft.	Remove guard rail	0.10	1.00	0.05
203	lin.ft.	Remove tile lines	1.00	1.00	1.00
162,593	cu.yd.	Class "C" excavation	0.24	0.32	0.35
940	hour	(Dragline) spec. swamp ex.	10.50	10.00	10.00
5	cu.yd.	Hand ditch excavation	1.00	5.00	1.25
2	marker	Project markers	3.50	12.00	5.00
21,417	sq.yd.	Area sodding	0.24	0.40	0.35
4.8	cu.yd.	Conc. eros. control struct.	40.00	50.00	60.00
15,291	cu.yd.	Embankment in place	0.35	0.50	0.75
180	cu.yd.	Random riprap	3.50	10.00	4.00
100	hour	Rental of bulldozer	9.00	7.00	7.00
170	hour	(Tamping roller) compact.	7.00	6.00	5.00
82	hour	(3 cu.yd. truck) truck rent.	3.00	3.00	3.00
381	lin.ft.	Furn. & inst. 12" s.c. culv.	1.65	2.50	1.40
60	lin.ft.	Furn. & inst. 15" s.c. culv.	2.10	3.00	2.00
564	lin.ft.	Furn. & inst. 18" s.c. culv.	2.65	3.25	2.50
536	lin.ft.	Furn. & inst. 24" s.c. culv.	3.70	4.50	3.50
272	lin.ft.	Furn & inst. 48" wood culv.	9.20	15.00	8.50
3,821	lin.ft.	Trench excav. 0' to 6'	0.70	0.75	0.50
2,190	lin.ft.	Trench excav. 0' to 10'	1.65	1.20	1.00
5,691	lin.ft.	F.&I. 8" clay or conc. dr. t.	0.75	.50	0.35
60	lin.ft.	F.&I. 10" clay or conc. dr. t.	0.80	.70	0.50
260	lin.ft.	F.&I. 18" clay or conc. dr. t.	1.25	1.50	0.90
390	lin.ft.	Trench excav. 0' to 6'	1.00	1.00	0.75
3,880	lin.ft.	Trench excav. 0' to 10'	2.55	3.00	1.50
130	lin.ft.	F.&I. 12" reinf. conc. s. p.	1.50	2.00	1.20
4,156	lin.ft.	F.&I. 24" reinf. conc. s. p.	3.65	4.00	3.00
7	basin	Drain basins	70.00	125.00	60.00
273	cu.yd.	Excav. for manholes	5.00	2.00	2.00
56.3	cu.yd.	Constructing manholes	50.00	45.00	60.00
6.2	cu.yd.	Constructing junction boxes	50.00	50.00	60.00
10	casting assembly	F.&I. casting assemblies	45.00	50.00	35.00
496	cu.yd.	Binder soil pit stripping	0.33	0.25	0.20
3,258	cu.yd.	Loading binder soil	0.60	0.40	1.00
12,067	cu.yd.m.	Hauling binder soil	0.12	0.20	0.15
81,464	sq.yd.	Stabilizing	0.07	0.05	0.04
163	m.gal.	Water	6.60	5.00	3.00
8,056	cu.yd.	Stabilized gravel in place	2.30	2.00	2.25
161	m.gal.	Water	6.60	5.00	3.00
28	hours	(Motor gr.) maint. compl. work	6.60	8.00	5.00
63.7	ton	Calcium chloride	33.00	30.00	28.00
2,035	lin.ft.	Railway track	1.00	1.50	3.00
840	cu.yd.	Sand-gravel fill	2.25	2.00	1.75

New York State Is Ready!

"New York Means Business . . . Business Means Better Roads" is one version of this state's fighting slogan for postwar. Plans ready for the first year and a $300,000,000 fund accumulated

By CHARLES H. SELLS
Supt. of Public Works, State of New York, Albany

AFTER fifteen years of a highway starvation era, New York State is prepared to take up the slack. The last normal highway construction program was advanced in 1930, and through eleven years of depression and four years of war, not only was the construction program completely stopped, but maintenance appropriations were cut to one-third.

A program involving the expenditure of $840,000,000 in the first five postwar years has been prepared, and already financial authority exists to start the work. This sum of money represents only a small excess over the amounts by which intervening appropriations failed to equal the 1930 level.

Surveys and planning have gone forward steadily in spite of the fact that many of the engineering staff have been called into the armed services and essential industry. Those remaining have worked continuously in the preparation of plans with the result that the first year's program is practically ready as well as some of the second year's. With the return of the veterans and with the amplification of the organization by the proposed employment of other engineers released from the armed forces and from war plants the balance of the design will be completed during the early construction period.

300 Million Fund

War activities have restricted state expenditures and without the imposition of additional taxes, surpluses have resulted each year. These unexpended revenues have been frozen into a postwar reconstruction fund which is now substantially in excess of three hundred million dollars and which will be amplified by the surplus being created in the current year of operation. These funds provide assurance that the program will get off to a good start, and normal revenues can be expected to complete the financing.

Prophecies of the future we face are overwhelmingly optimistic. Certainly, the same American enterprise which rose to such towering heights to create the world's greatest war machine can be counted on to produce a postwar scheme of living which will insure higher standards for all. Such a future means business and plenty of it. Industrial, commercial, and agricultural expansion are inevitable. More freedom is expected for recreation with more people taking to the open road. Highway service is linked hand in hand with all of these activities, and must be expanded to permit the economic renaissance which will certainly follow the end of the war.

The Department of Commerce of the State of New York has adopted a slogan that "New York Means Business," and the Department of Public Works adds the corollary that "Business Means Better Roads." That the Governor and Legislature are mindful of these conditions is evidenced by the fact that they have promptly and adequately supplied the necessary legislative authority and financial support to insure the program proposed.

Many Constructive Steps

Many forward-looking steps have been taken in the past two years to insure highway development. Legislation has been adopted and approved providing for the acquisition of rights-of-way for the expansion of the state highway system by and at the expense of the State. This formerly was a local obligation with the costs burdened on local real estate. Now local hardship will no longer be an obstacle to the adequate construction of a needed highway.

At the recent session of the Legislature an act was passed and approved by the Governor providing for the construction by the State of arterial routes through cities. This is the first time in the history of the state that a city can expect the State to assist in solving its heavy traffic problems. As a result we may hope for the early removal of many of the hazardous, time-consuming traffic bottlenecks which for years have prevented the free flow of traffic throughout the state. With the exception of a 50% share in the cost of new right-of-way, the entire cost of this arterial construction will be borne by the State.

The Legislature, with the approval of the Governor, has liberalized the state policy with respect to the construction of state highways through villages. Local contributing costs for widened pavements and incidental highway necessities have been completely removed and local financial stringency can no longer be expected to defer a needed improvement.

Thruway Progress

Legislation for the great thruway has been expanded to permit the acquisition of the necessary rights-of-way and the actual construction operations. This highway, in process of design as "the best in the world," passing as it does within thirty miles of almost 80% of the state's population will be one of the greatest contributing factors in the successful economic development of the state.

Both the Governor and the Legislature seem to have given tacit approval to the $840,000,000 five-year construction program recommended last year by the Department of Public Works. By the creation of the postwar reconstruction fund, the start of this program at the proper time is insured, and there remains only a small amount of financing to guarantee the completion of the entire program.

Through the medium of the Postwar Public Works Planning Commission, the State has provided subsidies to the various local governments throughout the state for the preparation of plans for needed highway projects as well as for many other required public works.

Extensive Reconstruction

Practically every feature of highway development is included in our postwar program. About one-third of the entire state system of highways will be rebuilt with modern pavements. Narrow, inadequate bridges will be replaced. The railroad grade crossing elimination program will be completed and perhaps another one started. A fair start will be made on the construction of the city arterial routes. Many traffic bottlenecks will be removed from the midst of our villages. Secondary roads in the rural areas will be improved. State parkways will be extended, and many existing railroad-highway grade sep-

arations will be revamped to meet modern demands. The thruway will be built providing the most up-to-date highway in existence and linking most of the large centers of the state. Highway maintenance and repair shops will be brought up to a standard which will enable them to serve the people of this state as the demands increase.

The thinking that goes into this planning is not of last year's vintage. It is hoped that every forward-looking conception of the needs of future traffic will be included in the designs under way. Safety features, heretofore overlooked or unknown, must be a part of every project. Construction methods must be streamlined to produce cheaper construction costs. Construction time limits must be reduced to provide a minimum of interruption of highway services. These are the functions of the contractors, and their committees are already formulating plans and procedures for these and other purposes.

New York State is ready. Grading contracts will be let within the next three months. As quickly as government restrictions on municipal contract operations are lifted, our engineers and contractors will resume the task of building an adequate and up-to-date road system. In five years the slack will have been taken up.

Bridge from Old Rail Span

By CHARLES R. POPPE
Associate Bridge Engineer California Division of Highways, Sacramento

A WARTIME salvage example which might also be applicable in peacetime, was the conversion of an old railroad girder bridge into a highway bridge on state sign route 44 near Redding, California.

The structure replaced was a 4-span timber bridge dating from 1912. This bridge began to fail during the 1942-43 winter, at which time it was practically impossible to get critical materials for non-defense highways. The solution was found in the purchase of an 82 ft. 8 in. through girder railroad span which had seen 24 years of service. The bridge had been bought primarily for its girders, the floor system being too narrow for a modern highway bridge.

In dismantling the bridge one step was that of carefully cutting away the floor beams at a point 3 ft. 11 in. from the girders, leaving beam brackets in place.

Adaptation to the route 44 site required several steps, including the following:

(1) After careful analysis about 12 in. of plate was welded on each floor beam bracket, making it possible to splice the original stringers back in new positions as floor stringers for supporting an 18-ft. concrete deck.

(2) Girder seats were built into the existing abutments to the elevation required for high-water clearance. This involved a 2.7-ft. raise in the highway grade and construction of new concrete wingwalls on abutments.

(3) The cut-away floor beams were cut up to furnish needed splice plates, etc. Effort was made to use existing rivet holes when possible to save labor and expense. Only 1.3% of the completed structure is new steel.

Contractor was Jack Gilmore. Moore Dry Dock Co., refabricator. C. A. Crayton, resident engineer.

Old and "new" spans on Oak Run Creek bridge near Redding, Calif., the "new" being a rail span adopted with only 1.3% new steel as a wartime salvage measure

1st Engineers First to Serve in Three Theaters

The War Department has announced the participation in the Okinawa campaign of one of the first Army units to see combat action in both the European and the Pacific theaters. The unit is the First Engineer Special Brigade, a shore engineer command organization which began its career of D-Days on the beaches near Oran, North Africa, Nov. 8, 1942.

The First Brigade headquarters took over command responsibility for beach supply operations on Okinawa on April 1st, having been shipped from Europe through the United States in February of this year.

Activated under the former Engineer Amphibian Command at Camp Edwards, Mass., June 27, 1942, the Brigade was headed overseas within one month of its activation date. After the landing at Oran, the First was converted from an amphibian to a shore engineer organization; they helped move the Seventh Army across the beaches at Gela, Sicily. In September, 1943, the Brigade was attached to the Fifth Army for the Gulf of Salerno landings.

A simple stone monument on Utah Beach, built by the surviving engineers, honors the men of the First Brigade who died to help make the Normandy landing succeed. Some of the engineer battalions sustained 30 per cent casualties in this action.

Bolivia Awards $9,500,000 Road Contract

The Republic of Bolivia has awarded a $9,500,000 contract for building a 250 mile, 16 ft. wide, highway between Cochabamba and Santa Cruz. The contract was let to the Compania McGraw, Warren Bros. S. A. This company is a combination of F. H. McGraw & Co., 1194 Whitlock Ave., New York, N. Y., and Warren Bros. Road Co., 38 Memorial Drive, Cambridge, Mass.

Editorial

What About Small Contract Jobs?

UNDER the title, "Wake Up Contractors," the publication, "Michigan Roads and Construction," recently waded into the state's road and street contractors for failure to bid or for bidding too high on small municipal repair projects. This editorial, combined with a reply letter from Walter Toebe, executive secretary of Michigan Road Builders Association, airs but doesn't settle a problem that is being felt everywhere.

Another Michigan City (Pontiac), the editorial observed, is headed for force account construction because contractors don't seem to care. At least they aren't bothering to submit bids—enough bids, at competitive prices. Once again it is a case of contractors' reluctance to bid on little jobs.

"You know what that means," this editor went on. "The city is seriously considering purchase of equipment to do the work with force account labor unless bid prices approach proper engineering estimates. Once a city goes into the construction business it stays there. It does bigger and bigger projects, and pretty soon it does them all."

As friend of contractors and believer in private enterprise as the American way, the Michigan editor then went on to cite some of the contractor's problems.

Mr. Toebe in his public reply elaborated on the reasons why contractors are rightly hesitant these days. Red tape is one—priorities for men, materials and equipment, etc. Wages and hours, for another. The contractor has had trouble knowing where he stands with the bureaucrats, and sometimes winds up paying higher wages and penalties that wipe out his profit.

OPA too has been administered by people who often didn't see eye to eye with the contractors. He never knows when he is guilty of some violation. No wonder legal and accounting costs are way out of line on little jobs. Not only must war restrictions be removed, but government red tape cut generally.

And finally, Mr. Toebe criticised the specifications of many cities as being full of confusing, complicated or contradictory clauses; requirements that if really enforced to the letter would make any contractor glad he wasn't low bidder.

The clear and reasonable specifications of the Michigan state highway department were cited as one reason why it has had no trouble in getting good bids.

Some governmental red tape will be with us for a long while, and little can be done individually about economic conditions. But street and highway authorities can comb over their specifications!

And one of these postwar days, there'll be a flood of work. When contractors can get back on a volume basis some of their bidding hesitancy will diminish.

▼

Activate Road and Street Programs!

FOR several years the word has been planning. Now it's action. The test of highway and street officials is the speed with which they can get going on postwar programs.

First must come speedy action when Congress reconvenes. The Federal Highway Act of 1944, to quote, provides that the first postwar fiscal year shall be that fiscal year which ends on June 30 following the President-proclaimed date of war emergency termination; *or* following the date specified in a concurrent resolution of the two Houses of Congress as the date of such termination; *or* following the date on which Congress by concurrent resolution finds as a fact that the war emergency has been relieved to an extent that will justify proceeding with the highway construction program, whichever date is earliest.

The necessary resolutions should be passed and at the earliest moment $100,000,000 in federal funds should be appropriated after determination of that fiscal year, as provided by this Act. The Act states that this sum may be appropriated to *become immediately* available for making surveys and plans and for construction, including right of way.

The highway and street departments have their job cut out for them. First is that of rebuilding their organizations. There may be stiff competition for engineers coming out of the Services. No time should be lost in bidding all on-leave and other eligible ex-employees to "come back home." For these and for new engineers most highway departments can offer very appealing inducements. Chief among these is security and steadiness of employment. With the huge backlog of waiting work, the ex-G.I. who casts his lot with a road organization may be the envy of others who face risk and uncertainty during the period of industrial reconversion.

Pay raises have been made, and these will help. But the main thing is for highway leaders to quickly begin a positive all-out hiring campaign.

It is hoped that Autumn, 1945, will see the letting of a considerable volume of earth moving and other contract work, and a vastly accelerated effort on plans preparation. A nation that is waiting for new cars is badly in need of new roads.

JOB and EQUIPMENT IDEAS

Send in your contributions to this idea exchange and help road building progress.* ROADS AND STREETS *will pay a minimum of $10.00 each for any publishable field or office methods or shop kinks. Why not pass this along to your staff and encourage them to send in brief "how we did it" descriptions, rough sketches or snapshots.

Old Bridge Salvaged With Grid Floor

The modern steel grid floor you see in the accompanying photograph of a small bridge saved the old pony trusses from having to be replaced, according to Allan M. Williams, county engineer of Ionia County, Michigan.

The old plank floor had rotted away and the existing trusses and abutments, while in good structural condition, could not carry a new concrete slab floor without serious overload. The grid floor, it was found, weighed no more than the planks, and the use of this construction gave the old spans a new lease on life.

▼

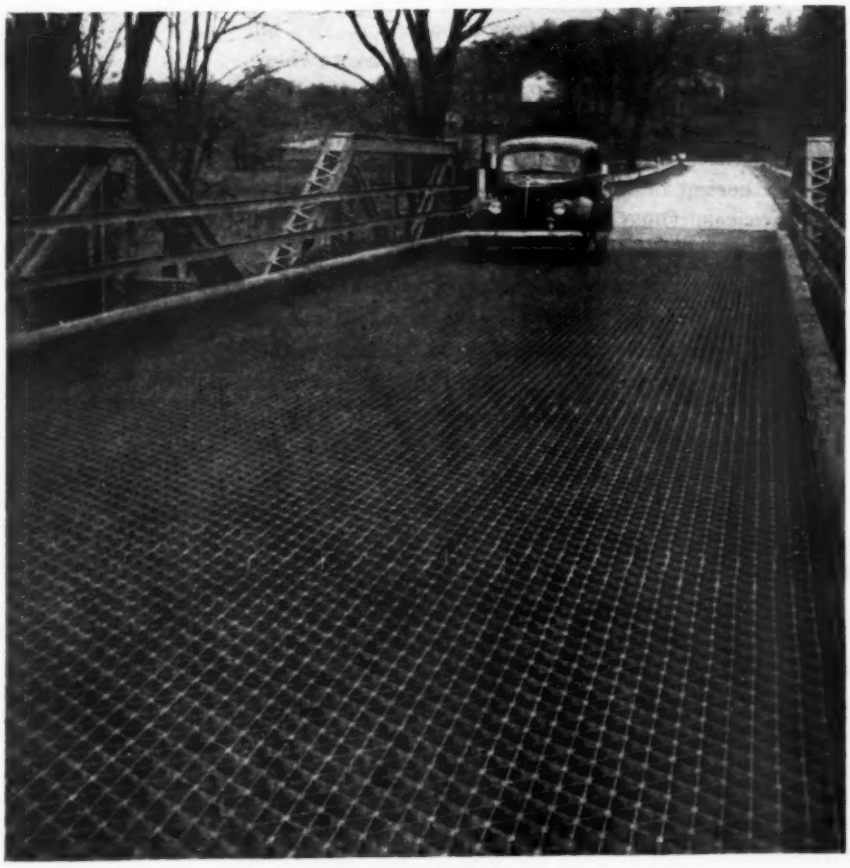
Safety rules for handling acetylene gas cylinders: Always consider each cylinder full and handle accordingly . . . keep greasy gloves from contact with valve . . . avoid roughness in handling . . . block securely in transporting . . . don't ever roll cylinders; use a carrier . . . keep away from heat.

▼

Contractor Spreads Sub-Base Gravel with Self-Powered Scrapers

A 47,000 cu. yd. gravel sub-base spreading job was handled by the same scrapers that moved long-haul dirt, on Raemisch-Madden's grading job on U. S. 66 near Chenoa, Ill., last year.

Eleven 15-yd. capacity self-propelled scraper units took the place of conventional trucks and spreader box on this operation. Pit run gravel was picked up 800 ft. away from the haul road and carried three miles. Pusher loading helped put 13-yd. gravel loads in the pan in about 120 seconds' loading time, in wet material. The 6-mile round trip took about 30 minutes. Gravel was spread in 4 to 6 in. lift, 11 ft. wide, taking about 30 seconds to unload over a 75 to 100 ft. distance.



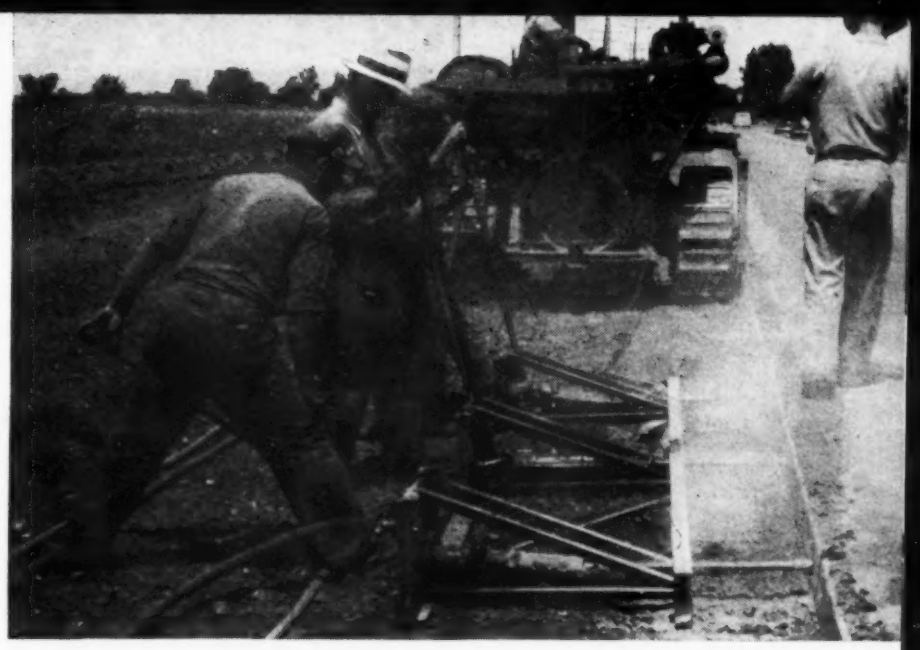
Big Pipe? Just Roll It Off

Is it necessary to set up timbers in order to roll pipe off of a truck or trailer? Not at all. If there's a bulldozer or other earth-moving rig handy, just pile up an earth ramp, as was done in this "pitcher" snapped on Franz Bros.' road job in Columbiana County, Ohio.

Battery of Jackhammers Drill Dowel Holes in Slab Edge

Again we cite a piece of labor-saving ingenuity used by the well-known Ohio contractor, A. J. Baltes. Up in Erie County, O., recently he had the job of drilling holes in the edge of a pavement slab for inserting tie bars specified for a concrete widening strip. The holes were drilled three at a time, accurately and speedily and economically, by setting three concrete breaker units horizontally in a structural iron frame (see photo). Specially designed for this purpose the frame included triangular bracing and head "pillows" for steadying each air hammer unit. Special long-shanked drill bits were used, held in position by being inserted through holes in a section of channel-iron. The whole assembly, weighing several hundred pounds, was held in position by foot pressure, while pressure was applied on the bits by means of hand fulcrums which the operators pulled toward them to force the jackhammers forward.

The outfit was dragged along from position to position by a tractor setting in the widening ditch. Air was supplied by a compressor mounted on the tractor.



Steel Building Forms Used on Bridge Deck

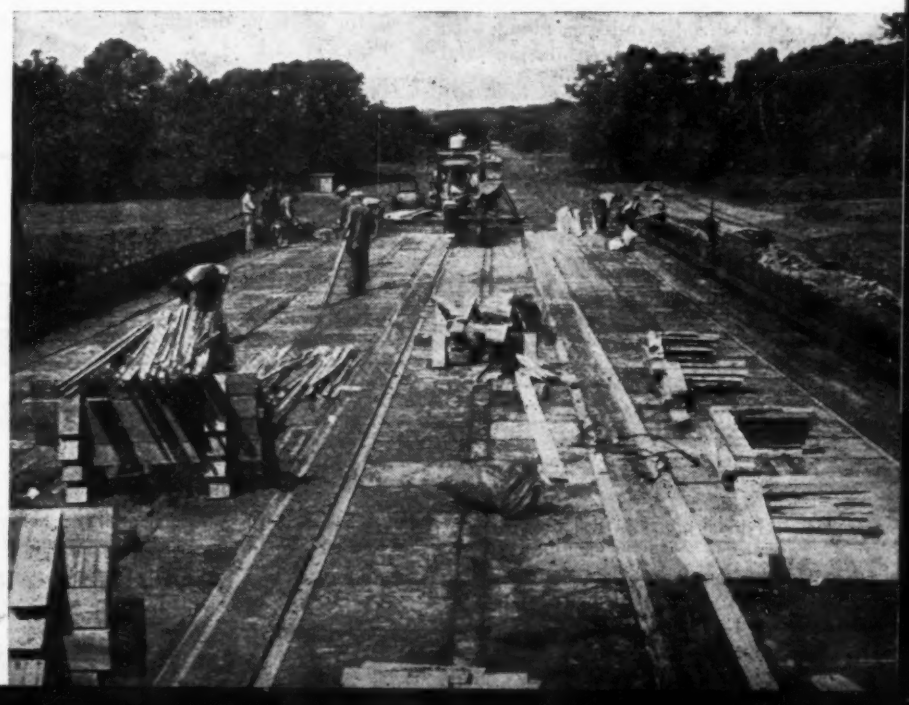
Use of prefabricated steel form panels helped Mauger Construction Co., Columbus, (O.) contractor, to save hard-to-get lumber late in 1944 on its concrete bridge job near Higgensport, Ohio. The bridge in question was a deck girder concrete structure continuous over several spans. Believed to be the first road bridge contractor to use such forms in this region the Mauger firm rented the panels from a building contractor in Ft. Wayne, Ind. Sections were bolted together in pairs for convenience in handling and erecting, as shown in photo No. 1. These forms were used not only for the underside of the deck slabs but also as side panels for forming the outer faces of the deck.

There were five parallel lines of girders, as can be seen in photo No. 2, two lines of panels, used in each of the four intervals between girders, failing by 6 in. to fill the width after allowing space for wooden V-strips to form fillets. A line of wooden 2 x 6's nicely filled this gap; photo 2 shows the strips in place.

According to Fred E. Swineford, chief engineer of construction, Ohio department of highways, the use of steel form panels offers real untouched possibilities in bridge construction. Shoring is often simplified. Labor and material costs can be cut and the job speeded by resourceful use of various types of commercial forms.

Two form panels bolted together to expedite handling. Note pile of forms in background

Forms in place, ready to place reinforcing steel



During wet weather trucks delivering base material to a 50-ft. widening trench were required by the engineer to stockpile on the adjacent pavement, in order to avoid rutting the rolled layer already in place. Material was later dozed off the slab and bladed out for rolling

Enlarging Randolph Field for 120,000-lb. Planes

Ten and 11-in. concrete on flexible base, the design answer; contractors producing all aggregates and base materials. Herein are brief highlights on design, field methods, and material production.

VERY heavy pavement is being completed this summer at a dozen southern airfields, in preparation for heavy bomber service. Typical in design details is that at Randolph Field, near San Antonio, Texas. Here M. B. Killian & Co. and E. B. Darby & Co., combined Texas contractors, have a $2,500,000 contract involving 350,000 cu. yd. of grading, 350,000 cu. yd. of processed base for sub-grade and shoulders, 560,000 sq. yd. of new concrete and 150,000 sq. yd. of stabilized shoulders, along with drainage, electrical installation and certain structures.

Pavement Design

The new pavement area, designed for 120,000-lb. planes, consists of widening strips and extensions for existing runways, and an entirely new 925 x 2,800-ft, apron. Typical cross sections are shown in the accompanying figures.

The existing 150 ft. runways are being widened to 200 ft. by the addition of a 50-ft. strip of 12-8-12-in. concrete on 8 in. of stone base and 6 in. of 95% density subgrade (see Fig. 2).

The runway extension (Fig. 1) consists of 200 ft. width of 15-10-15-in. concrete supported on 8 in. of flexible base (95% density, mod. AASHO).

The widened and lengthened runway is flanked by stabilized shoulders, 50 ft. in width, which will have 2 in. of asphalt stabilized surface, 6 in. of rolled gravel and caliche base, and 16 in. of select material subbase.

The entire runway cross-section is built up in elevation well above the prevailing flat ground surface of the field. As a further pavement support all embankment under pavement

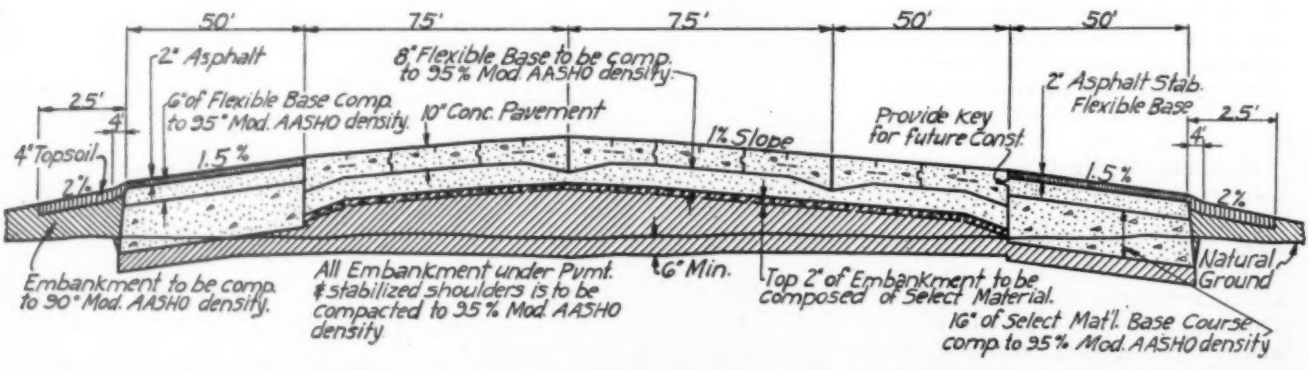


Fig. 1. Typical cross section of runway extension, showing 15-10-15-in. concrete and heavy base designed for 120,000-lb. planes. The surface contour conforms to that of the existing 150-ft. runway which is being widened by addition of a 50-ft. slab

(Left): An elevating grader peeled up most of the 350,000 cu. yds. of gumbo moved. The contractor believed in having plenty of wagons always coming up. (Right): Ten sheepsfoot outfits worked on compaction of subgrade and base

and stabilized shoulder areas was rolled to 95% density to a depth of 6 in. or more below original ground level. Specifications required that the top 2 in. of subgrade be comprised of select material as rain protection in the event that subgrade preparation got too far ahead of base rolling.

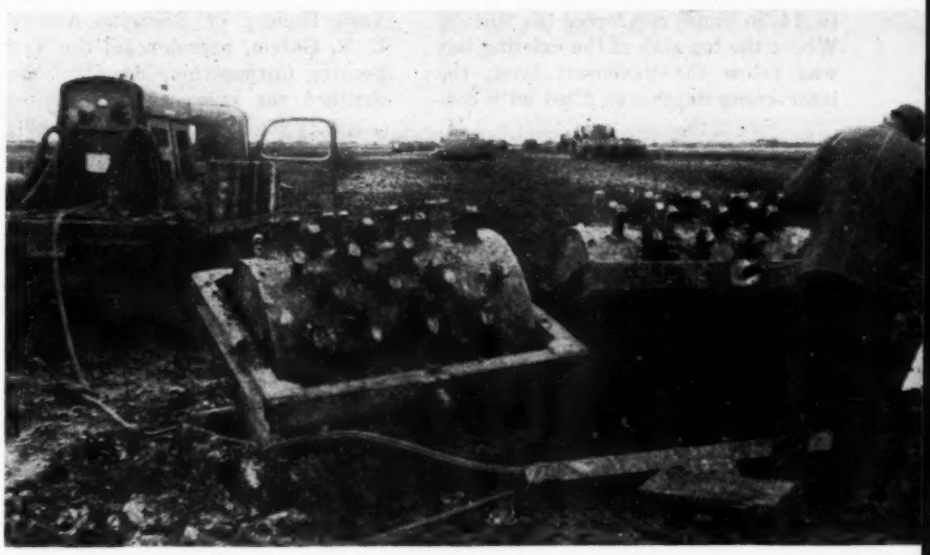
Taxiways (Fig. 3) will be 16-11-16-in. concrete on 8 in. of gravel-caliche base and 6 in. minimum of compacted subgrade or subbase.

The apron also is of 16-11-16-in. concrete on 8-in. base and rolled earth layer, the concrete being thickened at longitudinal expansion joints spaced every 100 or 75 ft. Concrete is placed in 25-ft. keyed lanes.

Slab Details

Concrete was placed with two pairs of 27-E pavers, each pair placing concrete from opposite sides. Vibrator units designed for the heavy slab were fastened on the front of the finisher with good results.

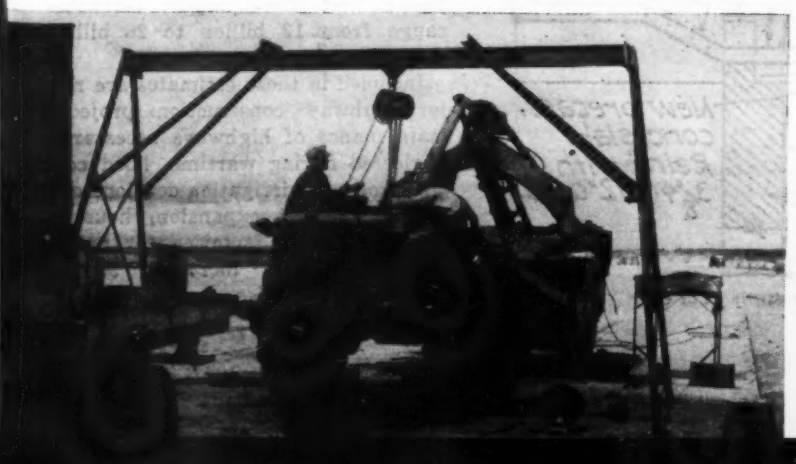
All pavement placed in 25-ft. keyed strips with dummy joints at 12.5 ft. Slabs are jointed transversely every 120 ft., with transverse dummy joints at 15 ft. In place of usual dowels, patented malleable-iron load transfer devices (Starr lugs) are specified at 1-ft. intervals for all transverse ex-

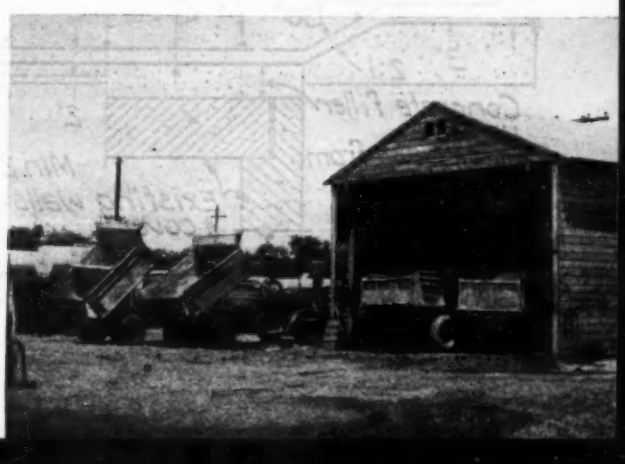


Welding a broken drawbar. The stiff, heavily clodded clay gave the diesel tractors a real work-out in pulling two double-drum sheepsfoot roller units

"How are the trucks doin'?" This question was of first concern to the master mechanic, who had to keep 70 trucks hauling for the 700,000 sq. yd. of base. The job was slowed up seriously for a while because of tire shortage

(Left): Replacing a broken transmission shaft—two men did it in a few hours aided by this portable field hoisting outfit. (Right): One of the five functional field maintenance shops, in which M. B. Killian & Co. and E. B. Darby & Co. took care of $1,000,000 worth of equipment used at Randolph Field. This shop is for trucks. Others specialized in automotive, heavy equipment, general maintenance, and machine shop work. Overhauling and special jobs were taken 18 miles to the contractors' headquarter's shops in San Antonio.





pansion joints, which have ¾-in. redwood filler. Longitudinal joints have asphalt impregnated fibre fillers. Tie bars are placed across the longitudinal dummy joint on outside strips.

No distributed reinforcement is being used generally. A special reinforced section was adopted where one taxiway was built over a concrete box storm sewer (Fig. 4). In order to bridge safely over the 3-ft. span box the 11-in. concrete was thickened to 14 in. and reinforced as shown. Where the top slab of the existing box was below the pavement level, the intervening depth was filled with concrete, and where the box was too high it was cut down on a new thin, heavily reinforced slab built to preserve the full drainage cross-section.

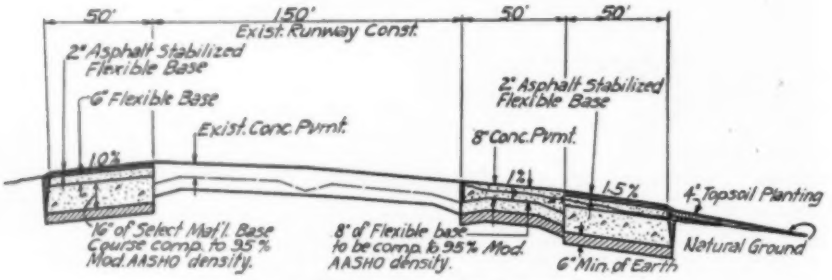


Fig. 2. Widening of existing runways

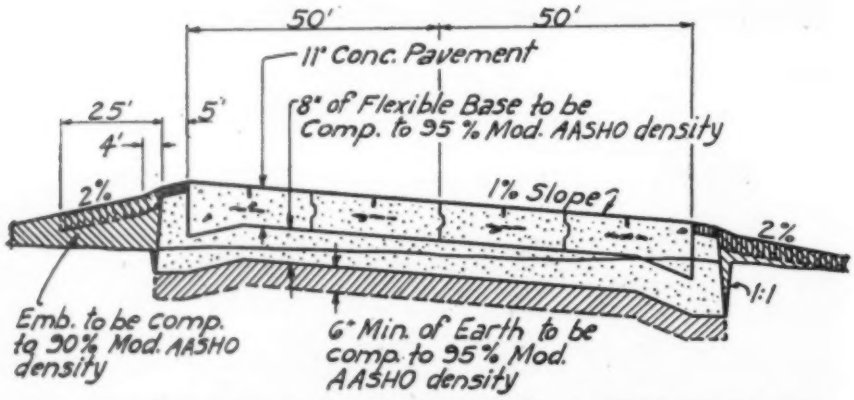


Fig. 3. 16-11-16-in. taxiway. Concrete of this cross-section also used for concrete apron

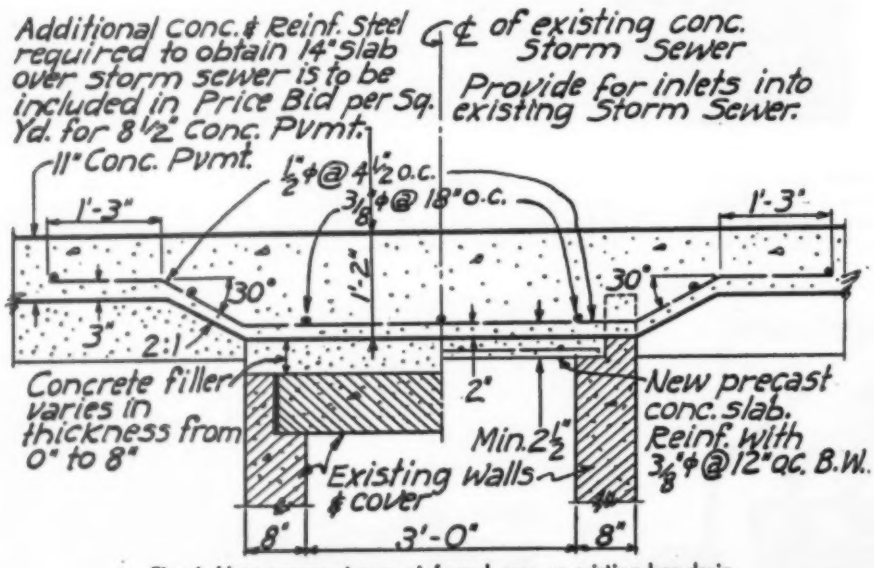

Additional conc. & Reinf. Steel required to obtain 14" Slab over Storm sewer is to be included in Price Bid per Sq. Yd. for 8 ½" Conc. Pvmt.
℄ of existing conc. Storm Sewer
Provide for inlets into existing Storm Sewer.
11" Conc. Pvmt.
½"ϕ @ 4½ o.c.
⅜"ϕ @ 18" o.c.
1'-3"
1'-3"
30°
30°
1'-2"
3"
2:1
2"
Concrete filler varies in thickness from 0" to 8"
Min. 2½"
Existing Walls
& cover
New precast conc. slab. Reinf. with ⅜"ϕ @ 12" o.c. B.W.
8"
3'-0"
8"

Fig. 4. How pavement was reinforced over an existing box drain

Galvin Forecasts Sustained Prosperity for Construction Industry

In a recent address before the New York Society of Security Analysts, E. R. Galvin, president of the Tyson Bearing Corporation, Massillon, Ohio, outlined the prospects for the construction machinery industry during the ten years following the war's end. This speech, widely acclaimed for its simple, clear cut analysis of the various post-war construction programs and their effect on industry as a whole, has been published by the Tyson Bearing Corporation and is available to key personnel throughout industry.

Mr. Galvin has spent many years in the construction machinery field, as general sales manager for the Caterpillar Tractor Company and in a similar position with the R. G. LeTourneau Corporation, and is a past president and member of the board of directors of the American Road Builders Association.

Since assuming the presidency of the Tyson Corporation, Mr. Galvin has continued to keep in close touch with the construction industry, believing that public construction is a stabilizer against depressive economic conditions.

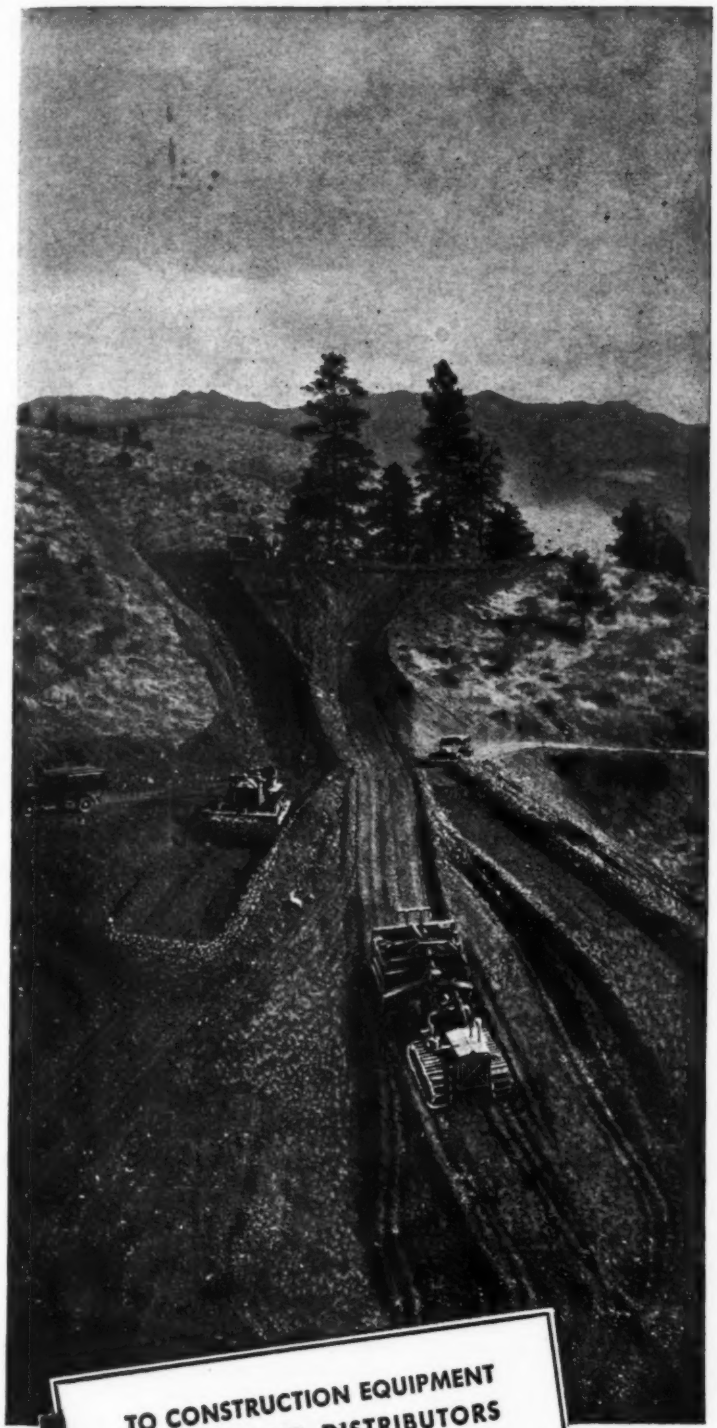
According to Mr. Galvin there are eight major factors which contribute to the very bright outlook for the construction machinery industry.

They are:

1. Important improvements in equipment resulting from intensive military use of construction machinery.
2. Greatly expanded foreign markets, also resulting from wide-spread "sales demonstrations" by our armed forces construction battalions as well as from building programs in foreign lands.
3. The vast backlog of road construction work that has accumulated during the war.
4. The existing shortage of road machinery equipment.
5. Our competitive advantage through control of patents.
6. A domestic demand that warrants volume production.
7. The absence of reconversion problems.
8. The existence of adequate merchandising outlets and factory trained service manpower.

Reviewing the huge post-war construction expenditure estimated by various authorities, Mr. Galvin revealed that these budget estimates range from 12 billion to 26 billion dollars.

Included in these estimates are major highway construction projects, maintenance of highways necessarily neglected during wartime, flood control programs, irrigation development, civilian airport expansion, housing, public building, factories for peacetime production, increased sewage and water facilities, etc.



LET'S CONSIDER THE ROAD AHEAD

Whether you bid on highway, railroad or building construction, success may depend on having the right tools to handle the job. Competition will be keen, bidding margins may be narrow. Profits depend on completing contracts on time . . . delays are costly and deadlines won't wait!

More than ever before, contractors need adequate equipment to handle the work that lies ahead. Place yourself in a position to compete and complete! Order available machinery NOW . . . and be prepared to buy the equipment that will be needed later.

Contractors can finance purchases of construction equipment through C. I. T. on a long-term basis at reasonable cost. When the equipment selected is ready for delivery, C. I. T. funds complete the purchase . . . payments to suit your needs can extend over many months . . . machinery helps pay for itself out of earning capacity . . . working funds remain intact.

Any sound business, small or large, can arrange for this financial backing with a minimum of negotiation. If your operating position can be improved through the use of additional capital ask our nearest office to explain how easily the matter can be arranged. Write, wire or 'phone for information.

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General view of 4-lane roadway showing how paved gutter is carried over crossovers. New 2-lane pavement at right; original 2-lane concrete road at left

Access Road to Atomic Bomb Plant

Paved gutter along median strip handles surface drainage. Simple labor saving methods used to excavate center ditch and place 3½ miles of gutter pavement, for a 4-lane access highway project to the now-famous Clinton Engineering Works near Knoxville

DOUBLE tracking of the concrete road from the edge of Knoxville out to the huge Clinton Engineering Works was completed this past summer, the finishing touches being hastened just as the news of the real purpose of this mysterious works was sprung on an astonished world.

Typical of Tennessee wartime concrete highway practice, the new pavement is 8 in. uniform, without dowels or other reinforcing. Expansion joints are spaced 120 ft. and premoulded dummy strips are inserted every 20 ft. The new 22-ft. pavement parallels an old 2-lane concrete roadway, separated by a median strip varying from 5 to 31 ft. in width.

Foster & Creighton Co., Nashville, the contractors, placed 115,000 sq. yd. of concrete, their unit bid prices including $2.40 for this item, $0.32 for 263,000 cu. yd. of grading; also clearing, structures and other items in a $600,977 contract awarded, June, 1944. Length of project, 7.4 miles.

How ditch was cut for the gutter. This is the third pass of the grader, which has a special curved blade

Paved Ditch Bottom

One interesting feature of the project is the use of an open ditch with concrete gutter in the bottom, in place of buried longitudinal drains along the center of the median strip. The ditch is designed to handle surface water from the pavement and from the turfed median section. It is also deep enough to have some subsurface drainage effect. The cross-section design along a 31-ft. median zone section in level ground includes a ditch 10 ft. wide at the top, paved in the bottom with a 3-ft. wide concrete gutter pavement. Gutter pavement is 8 in. thick uniform, the subgrade being given the same reverse crown as the gutter surface. The gutterway is carried under cross roads with concrete culvert pipe, and concrete pipe outlets are provided.

Because the job was beset with shortages, 1,300 lin. ft. per day was the best run of the 34-E dual paver. The modern finishing outfit used included a spreader, finisher, longitudinal power float, dummy joint machine, and black line machine (contractor built). Concrete was given a broomed finish and membrane cure.

Concrete was vibrated by two units, one along the inside of each form, vibrator equipment being towed behind the spreader. Labor was saved

(Left): Close-up of a special blade, consisting of a standard grader blade cut to the shape of the ditch bottom and shortened. The same blade is useful in later passes for rounding the upper edges of the ditch and smoothing dirt alongside. (Right): Two and sometimes three men were needed to draw this strike-off board along for fine grading

How the freshly placed concrete was struck off

Hand trowel finish was followed by application of membrane curing materials

and wear and tear on the vibrators was reduced by keeping the vibrators always setting down in the concrete, and cutting them in and out as desired with a cut-off switch.

Special Grader Blade Simplifies Ditching

The ditch was prepared with virtually no hand labor, by skillful use of a motor grader equipped with a special blade cut to the shape of the ditch bottom. The first pass or two practically completed the shallower ditch sections. Where a deeper ditch was called for, the operator secured the desired rounded contour by adjusting the angles of his blade.

After minor hand dressing of the ditch, 2 x 8 timber forms were placed, and the curved ditch bottom was finegraded by drawing along a specially built wooden strike-off board (see photo). One man pulling and two pushing with downward pressure proved able to supply enough power to shape the subgrade satisfactorily.

Ready-mixed concrete was chuted to place and struck off by a three-man screed similar to that used on the subgrade. Two finishers followed with short, hand-held wooden strike-off blocks (about 24 in. in length), after which the ditch was given a hand trowel finish and a membrane curing application.

Near the ends of work sections the heavy strike-off screed was dispensed with and the stiff concrete shaped to gutter sections entirely by hand. As the project progressed it appeared to the contractor that hand strike-off was probably as economical a way as any for this narrow concrete strip.

The 3.5 miles of gutter was placed largely after roadway paving was completed, a crew of thirteen men placing about 1,300 to 1,400 ft. of gutter per day.

L. P. Hoge was resident engineer on this project, which was under the Knoxville division of the Tennessee highway department, G. W. Prater, division engineer, and Elmer Reed, acting div. construction engineer. C. W. Phillips is commissioner of highways and W. T. Brooks, state highway engineer of Tennessee.

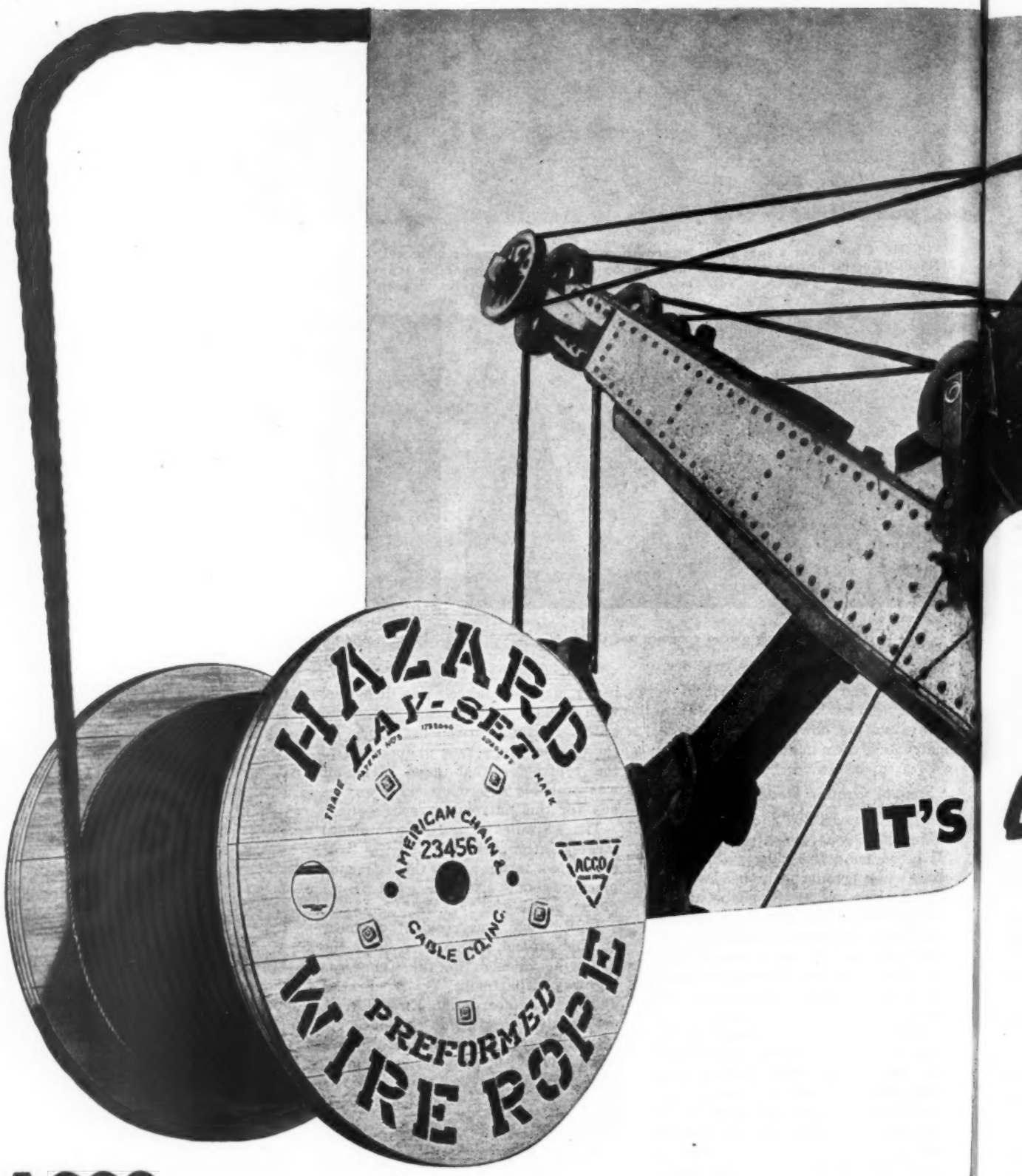
This method of shaping the concrete also proved expedient. Each man has a 24-in. length of board with cleats nailed on as handles

▼

State Transportation Maps

The Public Roads Administration has prepared a revised edition of the California transportation map for general distribution. The map consists of 21 sheets, each 26 in. by 36 in. The map, drawn to a scale of 4 miles to the inch, shows in color the location and character of all state and federal-aid highways, important secondary road connections, airports, canals, navigable streams and other transportation facilities in California. Boundaries of national and state forests and parks, Indian reservations, wild-life refuges and recreational areas, and roads leading to them, also are shown.

The California map is one of a series which PRA has issued since 1936. Maps have been published for 26 States. Maps for 11 other States are in process. Copies of the California map may be obtained from the superintendent of documents, U. S. Government Printing Office, Washington, D. C. The price for the complete set of 21 sheets is $5.50.



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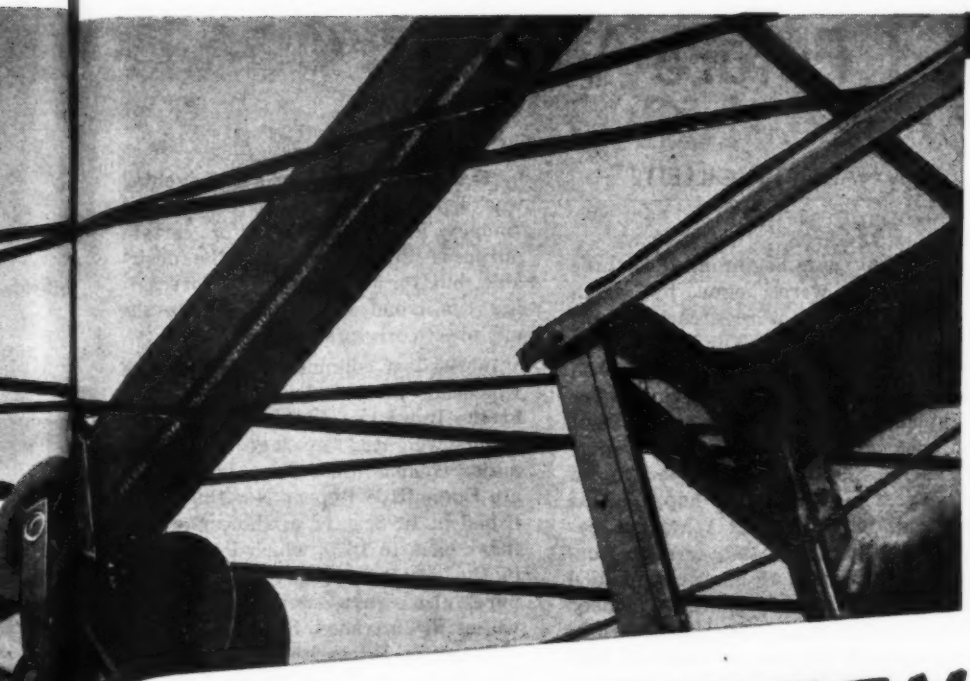

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Past and Future Wages

By HALBERT P. GILLETTE

THE economic question now uppermost in the minds of most Americans is: What will be my annual wage during the years following the war? The great question is not one of daily but of annual wage rates; for high daily wages may exist when annual wages are low.

The accompanying table gives the most reliable information as to what average annual wages in America have been at 10-year intervals for 90 years. The annual wages were those in American factories as deduced from U. S. census data, beginning in 1849 when the first statistics of that kind were gathered. Up till 1879 there was no separation of "salaries" from "wages"; so the table gives the average of both. Thereafter the table gives only the average annual wages. In 1889 annual wages excluding salaries were 10 per cent lower than annual wages including salaries; but in 1939 the difference was only 2 per cent.

One of the two most significant things in this table is that the upward trend of annual wages in factories has been about the same as that of per capita money (outside the Treasury) up to the year 1939. Since wages have been controlled by federal ukase in recent years, this relationship between annual wages and per capita money has not existed. But it is highly probable that within a few years after wages cease being controlled they will rise to the new level of per capita money. In that event, even if there were no further increase in per capita money, annual wages probably will be nearly two and three quarter times what they were in 1939. This, at any rate, is what the wage history of 90 years leads us to expect. Should per capita money increase another 10 per cent, as seems likely, post-war wages probably will become three times as great as prewar wages.

Factory Wages, Per Capita Money and Wholesale Prices

Year	Annual Wage	Per Capita Money	Wholesale Price Index
1849	$247	12.02	83
1859	281	13.85	90
1869	378	17.63	122
1879	347	16.75	87
1889	445	22.52	89
1899	458	25.62	75
1909	516	35.41	94
1914	552	34.35	99
1919	1141	53.71	198
1925	1269	53.13	148
1929	1300	54.33	136
1935	1015	52.68	114
1939	1152	79.97	110
1945	....	218.73	...

Footnote: Per capita money outside the Treasury as of June 30.

In the 90 years beginning 1849 three great wars were begun by which American wages were greatly affected. During the Civil War that started in 1861, per capita money increased about 50 per cent and wages were doubled, but afterward dropped about 25 per cent until they became proportional to the increase in per capita money. The same thing happened as a result of the World War that began in 1914. The vastly greater currency inflation that has accompanied the present war would have caused the greatest wage rise in American history had not the government held wages down. When it ceases doing so, and economic law again is free to operate, it will not be many years—possibly not many months—before wages will rise enormously.

Recently the presidents of the two great labor unions have declared in favor of cessation of federal wage regulation after the war. Congress will not dare to refuse such a demand, as I pointed out in January, 1943.

Political economists have usually argued that wage and price inflations are primarily dependent upon inflations of individual bank deposits. Since 1900 per capita bank deposits have averaged 4 to 6 times as much as per capita money, and have served as money. But since in America such deposits are based on money, there is no need of considering any thing but per capita money when forecasting the long-time trend of wages.

It will be argued that when in 1934 President Roosevelt reduced the weight of the gold dollar 40 per cent, his object was to inflate prices and wages, but that it failed to do so. This act of "clipping coins," coupled with repudiation of the government's printed obligation to pay federal bond interest and principal in gold dollars of a stated weight, so alarmed bankers and investors that it defeated its own purpose. However, that coin-clipping act is now about to bear price and wage inflationary fruit, at the very time that such fruit is least desirable.

The per capita money in the accompanying table is all money outside the U. S. Treasury on June 30 of the given year divided by our estimated continental population as of that date. Up to 1922 this per capita money was called per capita money in circulation; but afterward that part "held by Federal Reserve banks and agents" was deducted and the balance called "money in circulation." For certain purposes this change may be desirable, but for the purpose of forecasting the trend of annual wages the old practice is preferable.

In the last column of the table the wholesale price index is that given by the Bureau of Labor back to 1890, using weighted average prices of major commodities. The Aldrich Senate Committee Report No. 1394, published in 1898, gave a wholesale price index back to 1840, which I have used in the accompanying table. That Report also gave weighted average wages in 20 trades. See the 100 page chapter on Prices and Wages in my Handbook of Construction Cost for these and other data and for economic laws of wage and price levels.

"Real wages" is a term often used to designate the ratio of "money wages" to "cost of living." Data as to "cost of living" published by our Bureau of Labor go back only to 1913; but since retail prices are based on wholesale prices, we may use the latter in measuring the relative buying power of wages, or "real wages." Hence divide the average annual wages by the wholesale commodity price given in the table to get relative "real wages." By doing so we find that "real wages" in 1939 were about three and a third times as great in 1939 as in 1849. It is safe to say that in 1949, "real wages" will be four-fold what they were a century earlier!

According to the Aldrich Senate Report above mentioned, the average length of the working day was 11.4 hours in 1840, and 10 hours in 1890. In 1939 it was about 8 hours. In spite of this great d e c r e a s e in hours of work, the greater use of power and machinery has so increased average output per worker that his "real wages"—that is wages measured in goods produced—have become four-fold in a century!

The age of mechanical power was ushered in by James Watt's invention of an economic steam engine. His first patent was granted in 1769, and his fourth in 1784 when he first described the use of his condensing steam engine to drive a road vehicle, or what we now call an automobile. The first steamboat in the United States in 1786 was followed by the first "steam road wagon" in 1787. The first steam locomotive on rails

(*Continued on page* 81)

How Detroit Is Sealing 1,000,000 Sq. Yd. of Old Asphalt

Specification and sequence of operations used in treating old cracked sheet asphalt and asphaltic concrete with sand-asphalt seal

By CHARLES SHATTUCK
Engineer of Asphalt Construction, Department of Public Works, Detroit

THE surface to be treated shal. be cleaned of all matted or loose dirt or other material by sweeping or flushing (small rotary power brooms, without the flushing, generally provide very good results for this operation). Any matted material must of course be removed by hand scrapers. All holes and large cracks shall be cleaned of all loose material and filled with sheet asphalt mix, fine graded bituminous concrete, or other appropriate bituminous patching mixture, and well compacted in place by tamping or rolling. This operation should be handled well in advance of the sealing operation so as to allow patches to cure and also to allow seal work to proceed without interruption.

Patching mixture, using any of the *S C Road Oils should not be used,* as the hot asphalt cement used in the seal treatment tends to soften and flux with the SC Oils, causing the patch to "pick up" under traffic. When RC or MC materials are used, a curing period of about a week should be considered. If the preparatory work is done well in advance of the seal treatment as suggested, this allows a sufficient time for curing.

Construction Procedure

To the cleaned and prepared surface, when dry and warm, there shall be applied uniformly with power driven pressure distributor, 0.25 gal. per sq. yd. of 120 to 150 penetration asphalt cement which has been previously heated to 340° to 380° F. This shall be covered immediately with 20 to 25 lb. per sq. yd. of warm concrete sand, which has been precoated with 2% (by weight) of MC-2 cut back. The precoating of the sand should be done in a pugmill mixing plant and when dried sand is mixed with the MC-2, the temperature of the sand shall be between 200° F and 230° F. The temperature of the MC-2 at time of mixing shall not exceed 130° F. The spreading of the precoated sand shall be done with an approved type sand spreader, where uniform control of spread can be utilized easily. After the initial covering with sand, the area can, if desired, be rolled once over with a tandem roller (5 to 8-ton) and opened to traffic.

The rolling operation may be eliminated and the area opened to traffic immediately after spreading of sand, providing the traffic is sufficient to compact it within a short time. After opening to traffic, additional precoated sand is applied (using spreader equipment) from time to time until no more sand can be absorbed by the asphalt. This maintaining operation of sand application should be continued as long as any "bleeding" is evident, and usually requires about three days time, in hot weather. Traffic is encouraged during his operation.

The seal coat construction is usually completed in 10-ft. widths (for a distance of 1500 ft.) and each strip is opened for traffic while the adjacent strips are being completed.

In suitable weather, one small street crew (12 men) can complete 10,000 sq. yds. of surface per day, using one distributor and eight trucks.

Summary of Operations Showing Equipment Used

1. Clean surface by sweeping or flushing. (Equipment—small rotary power broom or power flusher, the latter seldom required.)

2. Patch holes and fill *large* cracks with sheet asphalt or other suitable patching mixture. (Do not use SC material for making patching mixtures.) (Equipment—small street tools such as "Spud" for cleaning large cracks, shovels, tampers, etc.)

3. Apply 0.25 gal. per sq. yd. of 120-150 penetration asphalt which has been heated to 350° F to 380° F. (Equipment—Power driven pressure distributor, preferably equipped with quick action positive shut-off nozzles.)

4. Cover, immediately with 20 to 25 lbs. per sq. yd. of warm concrete sand that has been precoated in hot mix plant with 2% (by wt.) of MC-2 cutback. (Sand should be not over 230° F when mixed with MC-2.) (Equipment—Dump trucks with truck hitches for spreader. Approved mechanical sand spreader, 10 ft. width, that can be easily controlled for amount of cover material, and operated either forward or reverse.)

In this spreading operation the spreader is always operated in reverse with the truck "backing-up" so that truck wheels do not come in contact with the asphalt cement, but roll over the sand cover. In the maintenance operation, the truck and spreader are operated with truck in front.

5. Roll the sand cover once with roller if desired, or open to traffic immediately, without rolling. The rolling operation can be eliminated. (Equipment—One 5 to 8-ton roller.)

6. While being used by traffic, spread additional warm precoated sand and continue this until no more sand will be absorbed by the asphalt. This maintaining should be begun after traffic has used the surface for one day and should be continued for about three days or until asphalt ceases to "bleed through." It may be necessary to use a small drag to rework some of the "whip-off" material back in the traffic lane.

Remarks: The kneading action of pneumatic tire traffic immediately following the application of precoated sand is a necessary part of this work and if traffic is not available, there should be abundant rolling with pneumatic tired roller or trucks. It is the traffic action that squeezes the sand into the cracks, along with the asphalt, and produces the seal. The precoated sand prevents any dust condition during the operation and aids in the absorption of sand by the asphalt. It also reduces "whip-off" to a minimum. The "bleeding" of the surface shortly after being used by traffic in hot weather is also a necessary part of the construction—a surface that does not "bleed" slightly and this "bleeding" finally balanced by sand absorption, will probably prove unsatisfactory for a tight seal.

No work of this type should be attempted when weather temperature is less than 75° F. Also it is advisable to omit seal treatment for a 3-ft. width along each curb in order to eliminate possibility of sand being thrown in catch basins.

Average Costs, Detroit City Area

(Average thickness of seal, ¼ in.)

	Per Sq. Yd.
Material Cost (FOB Plant)	$0.04
Street Labor (Including hauling & street maint. work)	$0.04
Preparatory work (Conditioning old pavement)	$0.02
Overhead & Supervision	$0.02
Total	$0.12

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*Reg. U.S. Pat. Off.

H5-13

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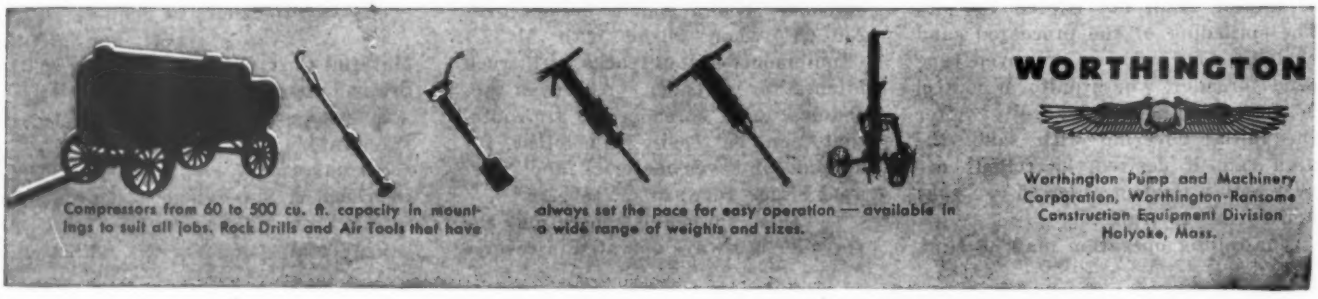

Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division Holyoke, Mass.

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Little Rock (2) R. A. Young & Son
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Cleveland (2) S. M. Clancey
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Oil City (2) Freeborn Equipment Co.
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Spokane (1) Columbia Equipment Co.
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Wyoming, Cheyenne (2) Wilson Equipment & Supply Co.

Buy Blue Brute

Worthington Pump and Machinery Corp.

Worthington-Ransome Construction Equipment Division
Holyoke, Massachusetts

(*Continued from page 78*)

was that of Trevethrick in 1804 in England. These inventions inspired others, much more so in America than elsewhere, for here there was least resistance by workers to the introduction of labor-saving devices. Encouraged by free-enterprise and by the hope of liberal profits and incomes, our inventors, scientists, engineers and manufacturers have produced the economic miracle above outlined. In doing so, they have made possible the winning of the greatest of all wars with a loss of American lives that has been amazingly slight. To our enemies we seemed to be very ill prepared for war on December 7, 1941, when Pearl Harbor was attacked. But in point of fact we were the best prepared nation in the world, for we had not only the greatest manufacturing equipment but men who knew how to convert it speedily to effective war service, and scientists who knew how to improve every type of war equipment.

▼

Alerting Maintenance Crews

A weekly bulletin, "Maintenance Reminder," sent to all district engineers and maintenance men of the state highway department of Idaho, calling attention to examples of negligent maintenance work, has brought excellent results.

The suggestion under this picture in the bulletin: "Cleaning slippery muck from ditch on curve in background of this picture and blading across oiled surface caused extremely dangerous condition that resulted in this accident. Choose proper timing for such operations and be sure to conspicuously sign, flag or otherwise warn the road user"

The plan was devised by T. Matt Halley, State Highway Director. On his inspection trips he takes photographs of highway conditions that should have been corrected, such as an unflagged w a s h o u t, unpatched holes, rocks on pavement, etc., etc. These pictures are used in his weekly bulletin and under each illustration is a terse reminder of what should have been done. Specific locations at which the photographs were taken are never given, the idea being that the responsible maintenance crew will recognize their own highway and will take steps to assure that their section doesn't appear in the bulletin again for some time.

This washout might have caused a bad accident. Accompanying the picture in the bulletin is the suggestion: "See to it that dangerous washes such as these are signed, flagged or conspicuously marked to warn the traveling public. Backfill as soon as possible"

Excellent pieces of repair work also are noted in the bulletin.

The results of this visual education program, which was started some ten weeks ago, are apparent in the increased interest taken by maintenance workers in their jobs.

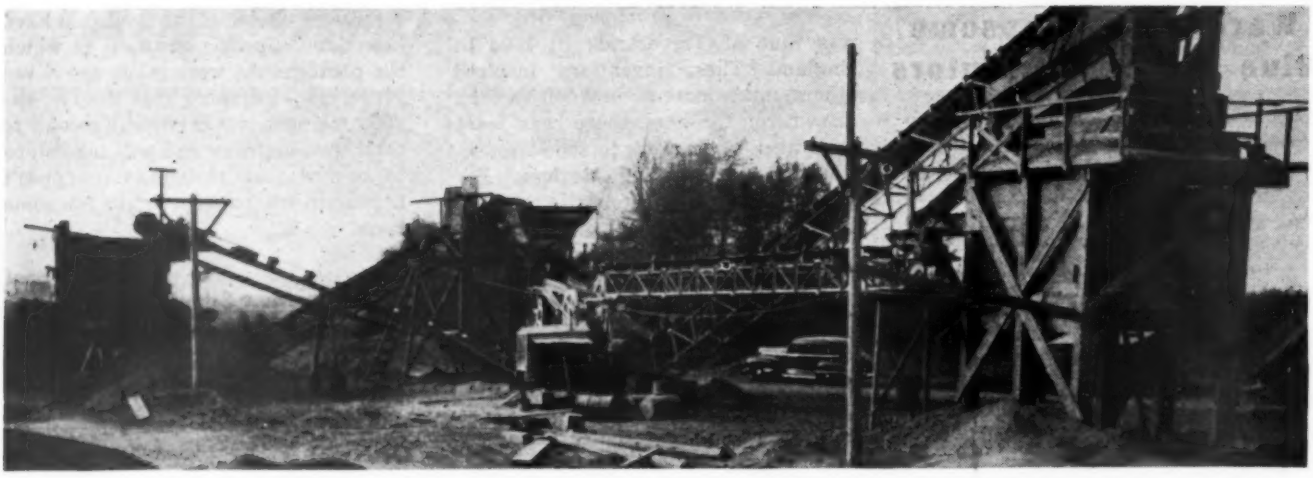
T h e accompanying illustrations show how the photographs are used in "Maintenance Reminders."

▼

Many Types of Projects on Texas Postwar Program

Texas contractors w i l l have a chance to bid on a great variety of work, according to facts on that state's postwar highway program given out by state highway engineer D. C. Greer. The three-year program outlined calls for expenditure of 173 million dollars. About two-thirds of the program, or 113 million, will constitute a continuation of arterial road construction. A larger share of such work will be urban in character than in the past, the within-city work being likely to total 30 million. The remaining third, or about 60 million dollars, will go for farm-to-market construction.

The average postwar project will be about six miles in length and cost about $50,000. A few large bridges and many small drainage structures will be built along with grading, stabilization and paving work.



Mercer-Fraser's aggregate plant, geared to eliminate 3 tons of fines for each ton of stockpile material

Open Graded Hot-Mix Successful in N. California

Permeable type of resurface adopted to help eliminate roadbed moisture during wet season. Methods on two contracts described

THE moist climate and heavy annual rainfall in northern California (60 to 100 inches) are fine for the big redwoods but give highway engineers some special roadbed problems. The subgrade becomes soaked and the heat of spring weather draws the moisture to the surface of bituminous pavements. Where a dense graded pavement exists, and the fines do not have a high asphalt preferential, the oil strips from the material and is concentrated in the upper portion of the mix surface resulting in its instability, distortion and eventual failure.

In 1944, engineers of the California Division of Highways decided to try out an open-graded mix on several two-course, hot-mix resurface jobs, in the hope that a porous mix would permit the escape of the entrapped moisture. Such a mix eliminating most of the fines that might become lubricated and unstable, was adopted for two projects. Gradation of aggregate was specified as follows:

Sieve Size	Per Cent Passing Base	Surface
1 in.	100	
¾ in.	85–100	
½ in.	35–65	
⅜ in.		100
No. 4	0–10	75–95
No. 8		15–30
No. 16		5–15
No. 200	0–2	0–2

Asphalt of 150-200 pen. was specified. Mixing temperature of 200-225° F. was specified and controlled with great care, the procedure being to coat the aggregate particles with all the bitumen that would adhere at this temperature, or about 4% by weight. The mix was spread mechanically and rolled without any special procedure.

Considerable waste was necessary in crushing and screening aggregate to meet these grading specifications. Crushed river gravel and stone were used. About 75% of the crusher run had to be eliminated as undersize, a fact which naturally added somewhat to the cost of this type of construction.

One of the two 1944 open-mix jobs was for 9.7 miles of two-course resurface 24 ft. wide on the Redwood Highway through and south of Garberville, Calif. Contractor was Clements & Co., of Harwood, Calif. Principal bid items as follows:

30 T. asphalt paint binder @ $35.00

10,000 T. mineral aggregate (base course) @ $5.22

3,140 T. mineral aggregate (surface course) @ $6.00

170 T. leveling mix @ $7.50

615 T. paving asphalt @ $25.00

Pushing aggregate to the hot-mix dryer, using combination dozer and loader

Excess fines were wasted (see arrow) except for quantity spread on freshly placed base to keep traffic from "picking it up."

150 T. liquid asphalt MC 5 seal @ $30.00

1,120 T. screenings for seal @ $5.00

Total bid was $107,000, including some additional aggregate. The job was set up in 3 sections, two being served from a river gravel source near one end and one section from an adjacent rock quarry.

On another 3.87-mile resurface contract near Scotia, Mercer-Fraser Co., Eureka, Calif., erected a gravel and hot-mix plant described as follows: This plant handled 7,500 tons from the one set-up.

River gravel was dragline loaded and trucked to a dumping hopper; fed by a reciprocating feeder onto a 24-in. belt; then passed to another hopper over a shaker screen, this screen passing all minus 1½-in. material.

Oversize material continued to an 18 x 36-in. jaw crusher, thence passing by belt to a 4 x 8-ft. sizing screen. Material retained on ½-in. and passing ½-in., respectively, was carried by bucket to bins. Oversize rejected by the sizing screen was returned to a set of 12 x 24-in. rolls and again was passed over the screen. Specifications required that material passing the two shakers consist of 95% crushed particles. Due to the lack of coarse particles, four tons of gravel had to be processed for each ton of material stockpiled, and separation and disposal of excess fines was a continual problem. About 20 tons per hour output was obtained.

Stockpiled aggregate was shoved and fed into the cold elevator of the hot-mix plant by a tractor equipped with both a bulldozer apron and a ⅛-yd. pivoting loader as shown in the accompanying photograph.

The hot-mix plant, including dryer, was electrically operated. Likewise all units in the crushing and screening plant were electric except the diesel-driven jaw crusher.

Paving Bus Stop Areas

WHERE heavily loaded public buses brake to a halt, as at lights and passenger stops, they put a severe strain on the pavement. Maintenance attention is necessary more frequently at these points, due to the shoving action of tires and the combined effects of static loads and vibration of idling motors. As in the case of aprons and warming pads vs. runways in airport design, the paving area at bus loading points needs to be of extra heavy design.

Indianapolis Beginning Extensive Program

Indianapolis street officials have had their share of the bus stop repair problem. This year their answer is a program of resurfacing or reconstruction that will make a good start toward covering the 2,300 bus stopping points on the city's street system.

The general policy is to repave these areas to match the surrounding pavement. A number of concrete paved areas are being undertaken, the work to be done by the city street crew. Ready-mixed air entraining concrete, 8 in. thick, is specified for these strips, which are to be 10 ft. wide along the curb or loading platform, by 80 ft. long. The city has its own mix trucks and concrete batching plant.

Some areas will be given a 2-in., two-course topping of asphaltic concrete to match the prevailing surface. This topping will also be used on old bases which still have considerable structural salvage value. The asphaltic concrete mix, prepared in the city's one-ton asphalt plant, utilizes crushed stone binder in a 6% bitumen mix similar to that specified for entire new street surfaces. Five asphalt crews are engaged in this work.

Bus stops to date have been repaved or repaired at city expense, but a plan is under consideration whereby the street railway company which operates the busses will share the cost, the railway furnishing the concrete while the city contributes the excavation. Foregoing data from asst. city engineer Frank J. Unversaw. Arthur E. Henry is city engineer.

Erie, Pa., Puts Concrete at Bus Stops

Erie, Pennsylvania, is another city which has done something about a bus stop pavement problem. The accompanying photos show this city's busiest downtown State Street corner before and after repaving a bus loading point with portland cement concrete. As part of the 14,000 vehicles daily using this street, some intracity buses make 1,200 daily stops here to load and discharge passengers. The badly displaced 3-in. sheet asphalt and the old concrete base were replaced with a 10-in. concrete slab 10 ft. by 50 ft. in area. Air entraining concrete was used here also. According to deputy city engineer Clarence K. Pulling, experience with this strip indicates that a width of 12 ft. would have been preferable.

▼

Illinois—A new bill was signed appropriating $15,000,000 for township farm-to-market road improvements from general funds, the first instance of such action in the state.

▼

Cuba Suspends Import Taxes on Machinery

The president of Cuba has signed a law suspending for three years custom duties, consular duties and any other taxes that affect the import to that republic of machinery, equipment or tools, not manufactured in Cuba, that will be imported to increase the national wealth and to execute any construction work.

Bus loading zone on State Street, Erie, Pa., after repaving a 10 x 50 ft. area with air entraining concrete

Pennsylvania depends heavily on high-speed plowing equipment, with plenty of horsepower under the hood

How Pennsylvania Kept 'Em Open

Nation's biggest snow fighting organization with 2,800 units and 16,000 men, battled worst winter on record

By L. J. CURRAN
Chief Maintenance Engineer
Pennsylvania Department of Highways
Harrisburg

THE Pennsylvania Department of Highway's preparation for winter activity is a carefully planned method of attacking winter conditions. Long before the first snowfall the Maintenance Unit prepares for meeting the winter assault. Long before it is necessary to use motorized equipment for winter work, mechanics check the machinery to determine what replacements and repairs are necessary. The Maintenance Unit of the Department is so organized that it can go into action within an hour's time, day or night, whenever snow or ice storms occur, and keep going as long as the emergency exists.

The Pennsylvania State Highway System consists of 40,683 miles of roads and the Department has committed itself to complete snow removal on 20,168 miles. The equipment is assigned to programmed routes and works continually until such time as the storm ceases and the routes have been opened to two-way traffic. That work completed, the equipment is then dispatched to the remaining 20,215 miles to open the improved sections for two-way traffic and the unimproved sections for one-way traffic, with sufficient cut-outs for passing.

To carry out such an extensive program as Pennsylvania has undertaken and to keep it running smoothly requires a complete plan of operation and a well-balanced organization to handle it efficiently.

State-Wide Organization; Its Advantages

There is a superintendent in each county who is responsible, under the direction of the District Engineer, for the efficient operation of equipment and personnel and who directs the snow-removal works in his county. Working under each county superintendent are his assistant superintendents, a garage foreman, mechanics, equipment operators, caretakers and laborers.

Each caretaker is responsible for the roads in his particular section and he immediately notifies the superintendent at the start of a snow or ice storm. He undertakes any cindering that is necessary, covering the various routes in the order of their importance. When the snowfall continues and it is apparent that plows will be needed, he so notifies the superintendent.

The garage foreman is the official who dispatches the equipment to the areas where needed. Plows are started when the snow reaches a depth of one inch and continue working until the roads are cleared and widened so as to be safe for travel. After the work is completed the equipment is returned to the county maintenance garage for storage, checked for necessary repairs and made ready for the next storm.

The method of control under this system is such that equipment and personnel can be transferred from one section of a county to another, or even from one county to another when severe conditions develop. When it is necessary to transfer from county to county, the transfers are arranged by

the district engineers. When an unusually severe storm is experienced in one section of the Commonwealth any needed units available in other sections are arranged for by the Central Office.

Geared to Fast-Moving Units

In assembling snow equipment, the Department has found it necessary to plan in terms of powerful fast-moving units. Light trucks with blade plows are used for the first snow fall, and are supplemented by the heavier units as needed for heavy snowfalls and drifting conditions. The larger units have standard frames for mounting blade plows, V-type plows and rotaries. In this manner of preparation, there is always motor power available for the particular type of plow that the actual conditions require.

The snow conditions in Pennsylvania during the past winter were the most severe in the fifty-seven years the United States Weather Bureau has kept records. Starting on December first, very heavy snow covered the entire state with the exception of a few counties surrounding the Philadelphia area. In Erie County, the snowfall was 151½ in. (the previous record depth of fall for a winter season in this county was 93 in.); Crawford County had 121 in.; Somerset County had 118 in.; Susquehanna County had 116 in.; McKean County had 105 in.; and Cambria County had 101 in.

The temperatures were unusually low for many weeks and the usual thaws were not experienced. This resulted in severe drifting each time the wind started and necessitated constant reopening on the majority of the routes. The opening of the rural routes comprising 20,515 miles presented an especially difficult problem as all available equipment was needed on the programmed primary system due to the excessive snowfalls and continued high winds.

During this period, the Department had working 15,934 men, including 1,410 mechanics and equipment operators; 1,040 trucks and 84 tractors owned by the Department, as well as 1,225 trucks and 424 tractors rented from private owners. In addition to this equipment, the Federal Government furnished the Department of Highways with eleven large trucks with Roto Blade Snow Plows, seven tractors with bulldozers, and three small trucks with Snogo Plows. The Federal equipment was used in northwestern Pennsylvania where conditions were most severe.

It was a 7-million dollar job to keep Pennsylvania's state system cleared

A 7-Million-Dollar Winter—Plus

Pennsylvania spent $7,318,000 on snow removal and cindering during the past winter, which was the greatest expenditure in the history of the Commonwealth. In past years the average expenditure has been approximately $4,000,000. Snow removal costs in Pennsylvania during a storm are about $4,000 on hour.

There are many reasons why this great expenditure of funds is necessary. One is the rugged topography of the state. It is transversed by mountains from southwest to northeast and for five months of each year, between November 1 and April 1, snow and ice storms may be expected at any time. In the mountainous sections of Pennsylvania the winters are quite severe.

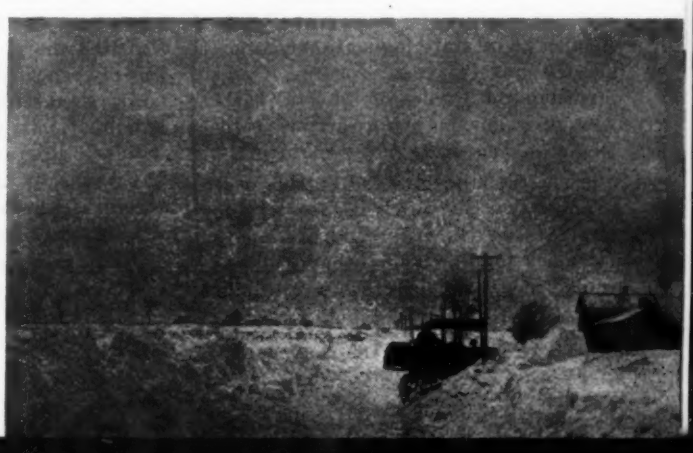
It is especially vital to provide highway service the entire year because Pennsylvania has 103 urban communities with 10,000 or more population. Yet 70% of the people live in communities of less than 100,000 persons. Because of wide distribution of population and the great number of war industrial activities, the trucking industries as well as motorists must have full all-year use of the highways. Great quantities of vital war material are trucked over Pennsylvania highways and the war effort must not be interrupted. No other state spends as much money in battling blizzards and snowdrifts in order that the roads may be open for travel during the entire year.

More Snow Fence Needed; How Abrasive Is Spread

In order to prevent drifting at the most critical places, 2,534 miles of snow fence was placed, as well as approximately 25 miles of natural evergreen snow breaks. Many more miles of snow fence are required and at present the Department is advertising for 1,000,000 ft. of additional fence and the necessary snow fence posts. In some sections it has been found necessary to place two or three rows of fence at intervals of from 100 to 125 ft. from the side of the road.

For ice control, the Department places its stock pile of abrasives at suitable locations during the summer months, when this material is available and can be distributed at a minimum of cost. The most successful distribution of abrasives has been with the small cinder spreader attached to the caretaker's wagonnette. This method of applying the abrasives has reduced the quantity of abrasive material to a minimum, which is approximately one-half of the amount required where the hand method is used. Mechanical spreading of abrasives has reduced manpower to a minimum. Where mechanical spreaders are used the most dangerous grades and curves can be protected

(Left): Reopening a drift-closed road. (Right): A tractor plow opening up a side road



in a much shorter time than the hand method. This operation tends to reduce traffic hazard.

Pennsylvania during the past winter tried all types of equipment. Fast-moving equipment, however, has proved to be the most satisfactory under normal conditions. However, tractor bulldozers and angle dozers, as well as rotary equipment will continue to be needed when extraordinary drifting conditions have resulted.

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New Equipment Needed

The past winter was especially hard on the Department-owned equipment. Numerous breakdowns were experienced on the older units which have been in service for many years. Some units are entirely out of service and cannot be economically repaired. Replacement is imperative and the Department is endeavoring to obtain some new units for use during the approaching winter. It is planned to proceed with a complete replacement program as rapidly as Governmental restrictions on equipment purchases are removed and the manufacturers are in a position to furnish. When this program is completed, it is believed the Pennsylvania Department of Highways will be one of the best equipped highway organizations in these United States.

Ionia County, Mich., Well Along on P-W Plans

IONIA County, Michigan, has a postwar highway program covering 99.1 miles of road improvements, according to Allan M. Williams, county engineer. Several features of its program are noteworthy. One is that this restricted mileage was selected for improvement. In common with other Michigan counties, Ionia County has had a difficult time spreading available funds over the large mileage for which the McNitt Act made it responsible (all local roads including township). The county today has 283 miles of county roads and 829 miles of township roads, in addition to the job of maintaining 134 miles of state trunkline roads, by contract. The 99.1 miles represent projects in various parts of the county that have been lined up to absorb unemployment, should it occur.

Another point is the steady progress made on surveys and plans. As of July 1, surveys had been completed for 4.0% of the mileage programmed, and plans completed on 22.6 miles or 23%. Most of the necessary right-of-way parcels had been acquired.

Naturally Mr. Williams has had his problems. What design standards to follow, was one. And what to use for manpower. However, some progress has been made every month, even if only one available engineer has had to alternate between surveys and drawing board. The county has taken advantage of state legislation advancing 50% of the cost of surveys and plans, and 80.5 miles of its total postwar program is being prepared by means of this state act.

About 14 miles of road on this program have been given considerable improvements already and are ready for black topping. This work included replacement or lengthening of all drainage structures, widening, and placement of 6 in. compacted depth of gravel to a width of 21 ft.

On all its postwar road plans, Ionia County has followed design standards which, it believes, will meet Public Roads Administration specifications in the event these roads are built under a Federal-Aid scheme for secondary roads. And such traffic-safety features as sight distances at grade crests, proper super-elevation of curves, grade widths and shoulder slopes have been given due attention along with economy of construction.

In line with Ionia County policy, the roads it desires to build after the war must be roads that can be travelled safely and comfortably and maintained economically.

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Tax Diversion Is Highway's Menace, Reminds Skelly of ARBA

American highways have been deprived of more than $2,000,000,000 in the past few years through tax diversion, James J. Skelly, president of the American Road Builders' Association, pointed out in a highway conference here this week. The Media, Pa., contractor praised the federal-aid airport bills now before Congress for provisions which prohibit the practice. He cited the McCarran Bill (S-2) favorably reported by the Senate's Commerce Committee which provides that federal funds for airports will be withheld from those states that divert any taxes on aviation fuel or other special fees on aircraft, aviation or aeronautical facilities or operations.

"Our organization is much interested in airports and airport legislation because of our Airport Division, and because the same methods, equipment and materials are used in both forms of construction," said Mr. Skelly. He added that the association had been called upon for expert testimony at the hearings on the pending airport bills.

"The present federal-aid highway law, while declaring that it is unfair and unjust to tax motor vehicle transportation unless the proceeds are applied to the construction, improvement or maintenance of highways, may deprive the state of only up to one third of its federal aid for such diversion," Mr. Skelly pointed out. "In consequence, all but fifteen of the states divert all or part of their highway user taxes to general funds, education, relief or other purposes.

"Sixteen states have passed anti-diversion amendments to their state constitutions — California, Colorado, Idaho, Iowa, Kansas, Maine, Michigan, Minnesota, Missouri, Nevada, New Hampshire, North Dakota, Oregon, South Dakota, Washington and West Virginia," the Road Builders' president stated.

Amendments will be voted upon in Pennsylvania this Fall and in Maryland and Texas at the general election in 1946. Voters of Indiana and Tennessee will consider the question in 1947, but the bill must also be passed by the legislature of that year. At the last session of the Illinois legislature, a resolution in opposition to diversion was passed.

"Oregon in 1919 was the first state to tax gasoline for highway purposes and others rapidly adopted this means of raising revenue," said Mr. Skelly. "In 1925, we find the first record of using this tax for something else. Up to 1932, raiding the gas tax was nominal, but in the past twelve years, the states have been dipping in more and more until the staggering total of more than two billion dollars was reached. Our postwar highways are going to need every cent that is available."

Figures for 1943 show $155,455,000 diverted from a net total receipt of $1,108,849,000 which came from motor fuel taxes, motor vehicle fees and fines, motor carrier taxes and the like, Mr. Skelly explained. Among the states making the greatest diversions were New York, California, Florida, Ohio, Pennsylvania, Texas, Georgia and Illinois.

"I regret that my own state of Pennsylvania is well up on the list of offenders, but that will be changed when the constitutional amendment goes to the voters in November," said the speaker.

Surfaced soil-cement street in the Knoxville program. Surfacing consisted of the following: RC prime 50 lb. of chips (¾-in. max.); "shot" treatment; ⅜-in. max. choke stone; seal and pea gravel

Soil-Cement Streets for Knoxville's New Housing

SOIL-CEMENT construction has been used for 68,250 sq. yd. of new streets in Knoxville, Tenn., recently. Comprising seven projects, all of this yardage serves housing that was rushed to help find shelter for some of the thousands of new families attracted by war industries (Knoxville's pop. up 34% since 1940).

The entire job was awarded in one contract to Pittman Const. Co., of Atlanta. The 6-in. x 20-ft. soil-cement was bid at 93 cents per sq. yd. This included considerable preliminary grading, some replacing of unsuitable material prior to processing, some rock removal and adjustment of 35 manholes to new grades and cement which cost an average of about 40 cents per sq. yd. The rather heavy two-course bituminous topping bid was 54 cents.

The soils for the soil-cement streets vary from gravelly, sandy loam to clay, requiring 12 to 14% cement by volume. Labor shortage and scarcity of repair parts for construction equipment prevented the contractor from obtaining large daily production.

As to financing, the city worked out an agreement with the real estate developers to pay 50% of the cost of storm sewers and graded and surfaced roads. No curbs, gutters or walks were constructed, since the city ordinance requires that these be built as a property owner petition and assessment matter.

The city made one desirable departure from past practice in that it specified 3 to 1 graded cut slopes along these streets. The clay soil in this area washes badly, and use of easy slopes instead of the customary 1½ to 1 has greatly reduced erosion during the period needed for sodding or turf development. The foregoing data supplied by B. C. Barker, director of public service of Knoxville, and L. C. Bailey, city engineer.

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Postwar Highway Notes

New York—A comprehensive program of construction and widening of arterial highways through cities and smaller localities is part of New York State's after-war program. According to a newspaper report, Public Works Superintendent, Charles H. Sells has visited, quietly and unannounced, nearly all of the cities in the state to inspect thoroughfares scheduled and make recommendations for widening or improvement. Later two assistants will make independent checks, and the district engineer a third survey. In about 50% of the surveys made to date in 20 cities, the recommendations have coincided; in the others, resurveys have been necessary. Cities and the state will pay on 50-50 basis for the widening right of way.

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Oregon—Portland city authorities have taken preliminary action toward building two elevated roadways, to cost $2,000,000.

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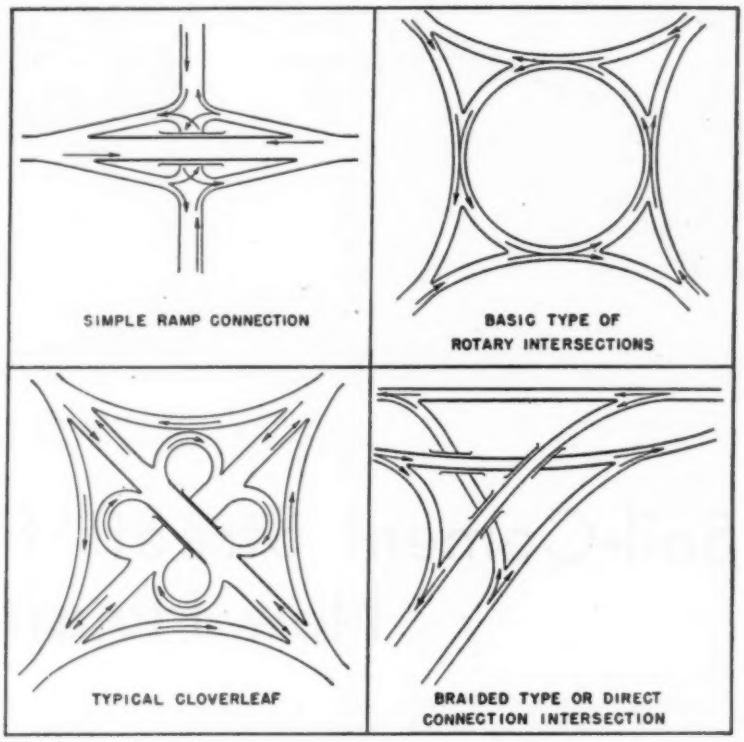
This soil-cement street serves a project of 141 homes built in 1944 for Knoxville war workers. Over 1000 such homes were given this type of street

Valley Highway Proposed for Denver

Preliminary plans completed for a 9-mile north-south expressway

A LIMITED-ACCESS highway through the city of Denver is being planned to give this city much needed express facilities. Preliminary plans for a 9.1-mile project have been completed and Crocker & Ryan, a consulting firm, are at work on general plans for about six miles of construction from the north city limits to 12th street including a cross-connecting highway. The Colorado state highway department will handle bids and supervise construction. The magnitude of the first unit alone is shown by the estimated quantities which include 2,000,000 cu. yd. of excavation and fill, 375,000 sq. yd. of paving and 40,000 lin. ft. of drainage. Some 20 new highway and two rail separations, several access and ramp structures and three cloverleaves, also remodeling of four existing viaducts, will be involved. Estimated cost of the entire highway is $14,500,000 including sewer changes.

The divided 4-lane roadway will have six access points in the first unit. Four types of traffic interchange are diagrammatically represented above.


SIMPLE RAMP CONNECTION
BASIC TYPE OF ROTARY INTERSECTIONS
TYPICAL CLOVERLEAF
BRAIDED TYPE OR DIRECT CONNECTION INTERSECTION

Interchange types planned for the Denver project

The Valley highway will include this proposed interchange at 38th Ave. and Fox St.

▼

Chinese Engineers Studying Highways in U. S.

Twenty-six Chinese engineers are now working with various state highway departments to obtain practical experience in highway and bridge design, construction, maintenance, equipment and material testing methods used by highway engineers in this country. They were brought to this country under the auspices of the Foreign Economic Administration, with the co-operation of the International Training Administration, Inc., and the Chinese Supply Commission. While in the United States they will receive subsistence pay under lend-lease provisions. The 26 Chinese are college or University graduates with C.E. degrees. Arrangements to work with the state highway departments were made by the Public Roads Administration.

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Horizontal Curvature Chart Aids Road Design

In order to promote uniformity of practice in horizontal curve design throughout the state, the California division of highways has developed a graph for determining the minimum radius of curve, as controlled by non-passing sight distance on horizontal curves where the sight distance is obstructed by an object off the pavement such as a bridge pier or cut slope.

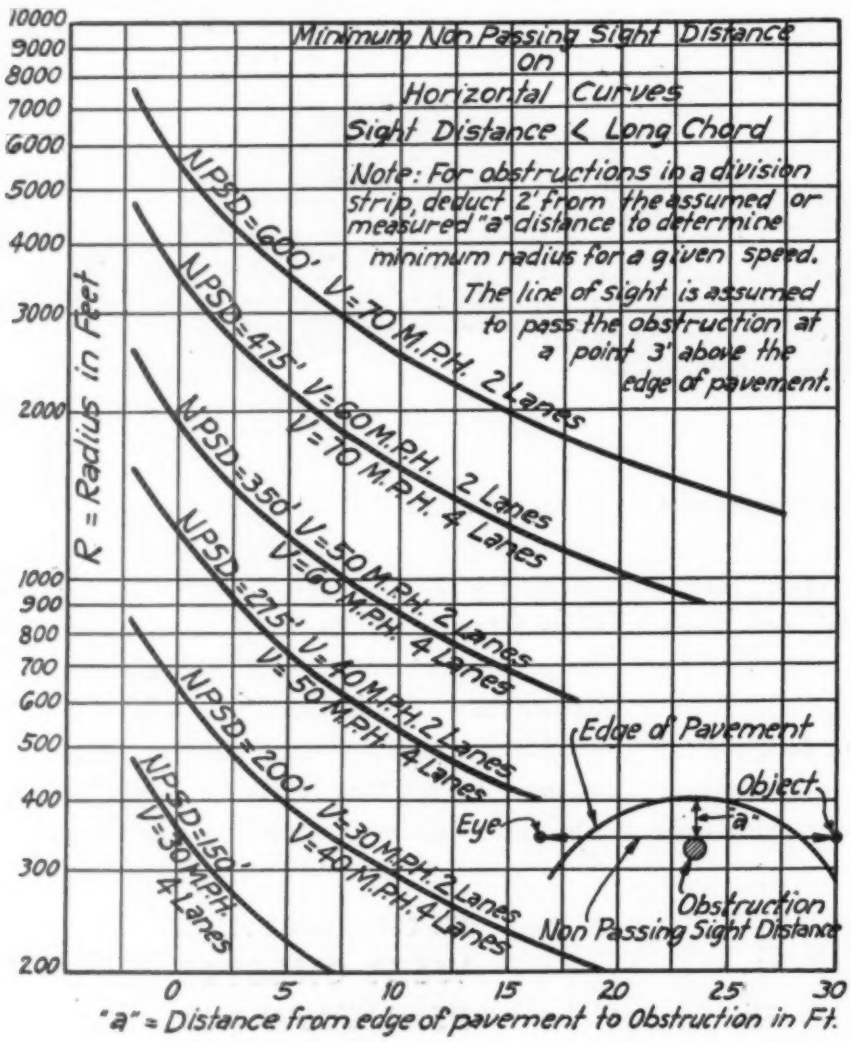
It is pointed out by R. H. Gillis, state construction engineer, that the minimum values for 4-lane highways are lower than for 2-lane highways, which is justified by the greater maneuverability possible on a 4-lane, and by the elimination of most of the hazard of serious head-on collisions that swerving to avoid an object might cause on a 2-lane highway. These represent minimum standards to be used and every effort within practical and economic limitations should be made to exceed them.

The same differential between 4-lane and 2-lane standards of non-passing sight distance may be applied to vertical curvature if substantial savings can be realized without sacrificing other important features of the design.

The following examples illustrate the use of the graph.

1. Assume a bridge over a divided highway with the face of pier 6 ft. from the edges of pavement on the sides and 4 ft. from the edges of pavement in the division strip and an assumed design speed of 60 MPH. From the graph, the minimum radius as controlled by the pier on the side would be 1,100 ft. The pier in the division strip would control the lanes in the opposite direction. Entering the graph with an "a" distance of 4-2 or 2 gives a minimum radius of 1,500 ft.

2. Assume a 2-lane highway with an 8 ft. shoulder, a 2 ft. ditch and 1½:1 cut slopes and a design speed of 60 MPH (miles per hour). The "a" distance for entering the graph would be 8 ft. + 2 ft. + (8x.09 super + 3) x 1½ = 15.5 ft. which gives a minimum radius of curvature of 1,200 ft. to allow a NPSD (non-passing) sight distance of 475 ft.


Minimum Non Passing Sight Distance on Horizontal Curves
Sight Distance < Long Chord
Note: For obstructions in a division strip, deduct 2' from the assumed or measured "a" distance to determine minimum radius for a given speed.
The line of sight is assumed to pass the obstruction at a point 3' above the edge of pavement.
R = Radius in Feet
NPSD=600' V=70 M.P.H. 2 Lanes
NPSD=475' V=60 M.P.H. 2 Lanes
V=70 M.P.H. 4 Lanes
NPSD=350' V=50 M.P.H. 2 Lanes
V=60 M.P.H. 4 Lanes
NPSD=275' V=40 M.P.H. 2 Lanes
V=50 M.P.H. 4 Lanes
NPSD=200' V=30 M.P.H. 2 Lanes
V=40 M.P.H. 4 Lanes
NPSD=150' V=30 M.P.H. 4 Lanes
Edge of Pavement
Object
Eye
"a"
Obstruction
Non Passing Sight Distance
"a" = Distance from edge of pavement to Obstruction in Ft.

Substructures Awarded for Mississippi Bridge at Memphis

Another major postwar project became "current" on July 18, when the substructure for main channel piers was let for a new highway bridge over the Mississippi River at Memphis. Merritt-Chapman & Scott Corp., New York City, was the award winner, with a bid of $4,333,174. The project which will ultimately cost about $10,000,000, includes 1770 ft. of main steel spans plus approaches. There will be two 435-ft. simple truss spans and a 5-panel cantilever system having span lengths of 433; 621; 621; 790 and 359 ft. A 4-lane roadway and two sidewalks will be provided.

Three subsequent contracts will be awarded. Bids for project No. 2, comprising the Arkansas approach, were rejected. The present contract stipulates that two main piers shall be completed within 480 calendar days and all seven piers and the one abutment within 760 days. Superstructure contracts are to be let during this interval.

The pier contract includes about 97,000 cu. yd. of concrete. The deepest foundation is expected to go to El. 89.00, or 98 ft. below near low water and 144 ft. below the 1937 flood crest. Alternate bids were taken on the open dredge tremie seal method and caisson method, the latter being chosen.

The consulting engineering firm of Mojeski & Masters, Harrisburg, Pa., was engaged to design and supervise construction of this bridge, which is a Federal-aid project handled jointly by the Tennessee and Arkansas highway departments and approved by the Memphis-Arkansas Bridge Commission.

The bids included $4,369,960 by KC Bridge Co. and Massman Const. Co., Kansas City, Mo.; $4,633,710, Dravo Corp., Pittsburgh, Pa.; $5,393,643, Four Companies, Boston; $7,438,930, by a group comprising Missouri Valley Bridge & Iron Co., Morrison-Knutson Co., Inc., and Winston Bros.

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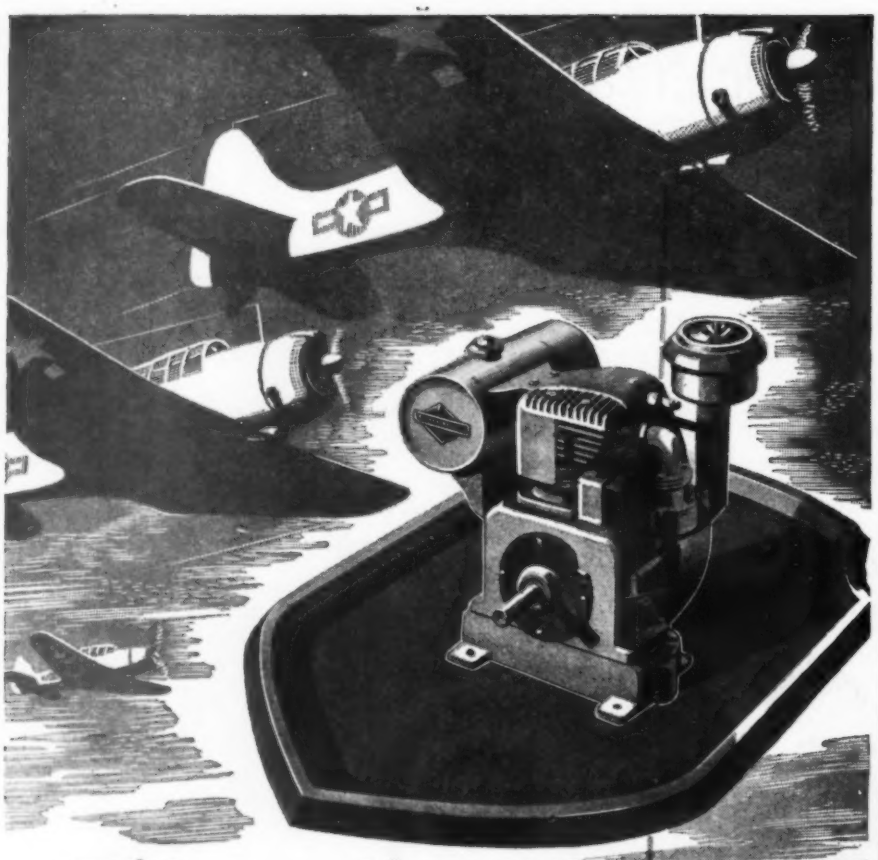

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Ice Control at Superior, Wis.

In order to control ice conditions following snow storms, L. B. Bartlett, Director of the Superior, Wis., Department of Public Works, developed the equipment and technique to meet the needs of the past winter.

On streets 60 ft. wide or more, snow was bladed into a windrow at the center and removed by a conveyor snow loader. On narrower streets the snow was bladed into the gutter. Then rock salt was applied in two 4-in. salt spreads about 5 ft. on each side of the center of the wide pavements, and in one spread on the center line of the narrower streets. Traffic and thawing took care of the distribution of the salt after application in the longitudinal spreads.

Hoppers having 2-ft. square openings at the top, with 2-in gate openings at the bottom were designed and built by the Superior Department of Public Works. One of these hoppers was mounted on the side of a light pickup truck. The salt was fed directly into the hopper, flowing through the 2-in. opening directly upon the pavement.

At each arterial intersection, a strip of salt approximately 100 ft. long was applied on the coming lane. Mr. Bartlett reports effective results using this method during the past winter.—**Public Works Engineers' News Letter.**

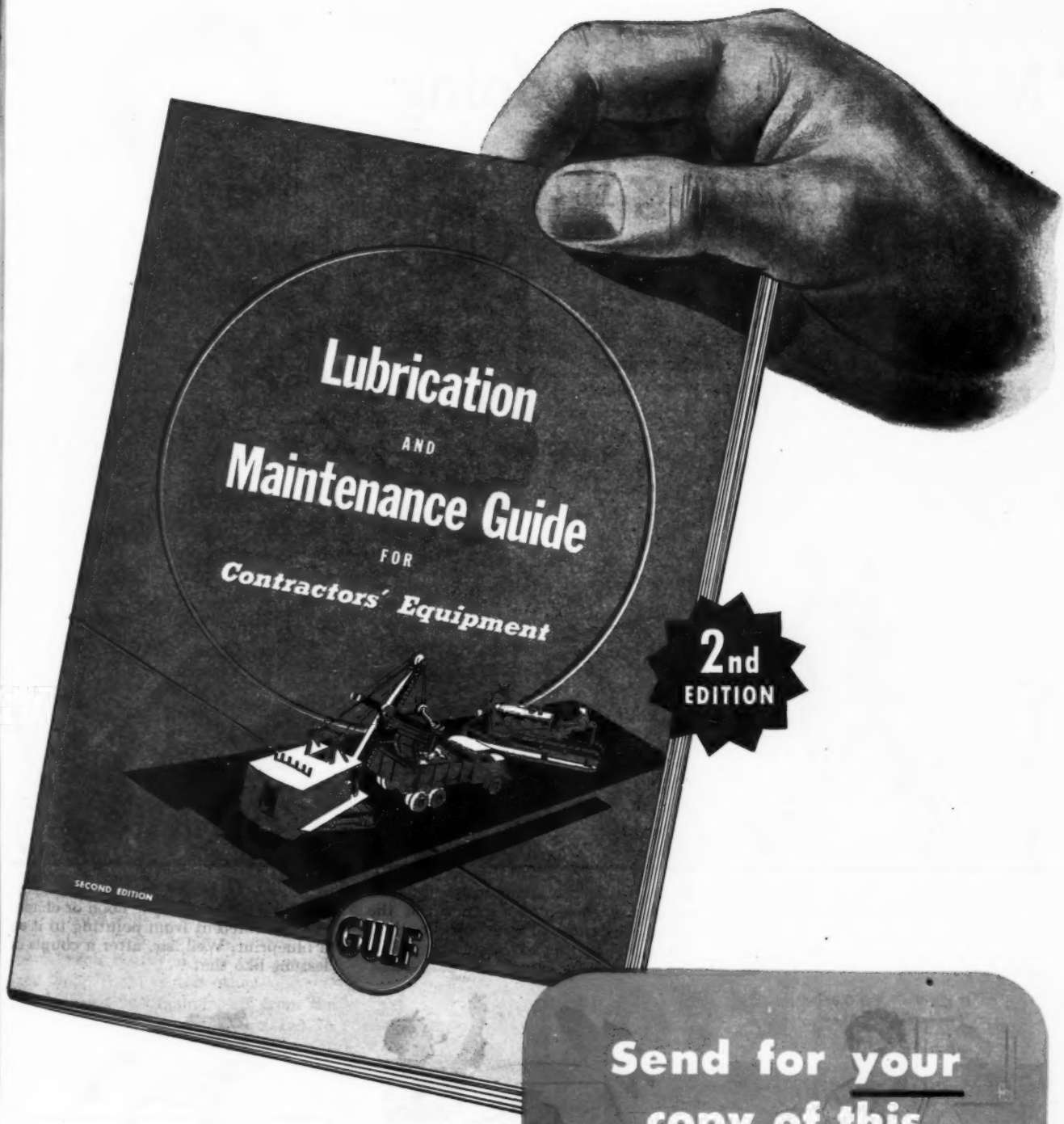
▼

Many Highway Organizations Considering Radio

More extensive use of 2-way radio after the war is planned by highway maintenance and others in road work, according to an article by H. A. Radzikowski, maintenance engineer, Public Roads Administration, published in American Highways. Such plans wait availability of equipment and issuance of regulations, licensing and allocation of wave lengths by the Federal Communications Commission. FCC recently allocated 16 radio channels for special emergency service, which includes highway departments.

Thirty-two states are using or plan to use two-way voice communication in connection with highway maintenance, the report states. Nine are using it now in varying degrees: California, Georgia, Kansas, Missouri, Oregon, Ohio, Utah, Washington and Wyoming.

Several counties also have had experience with radio. Chautauqua County, N. Y., reports that a 30% reduction in the number of snow plow outfits was made possible by the use of radio which permitted more efficient spotting and control of equipment during storms.



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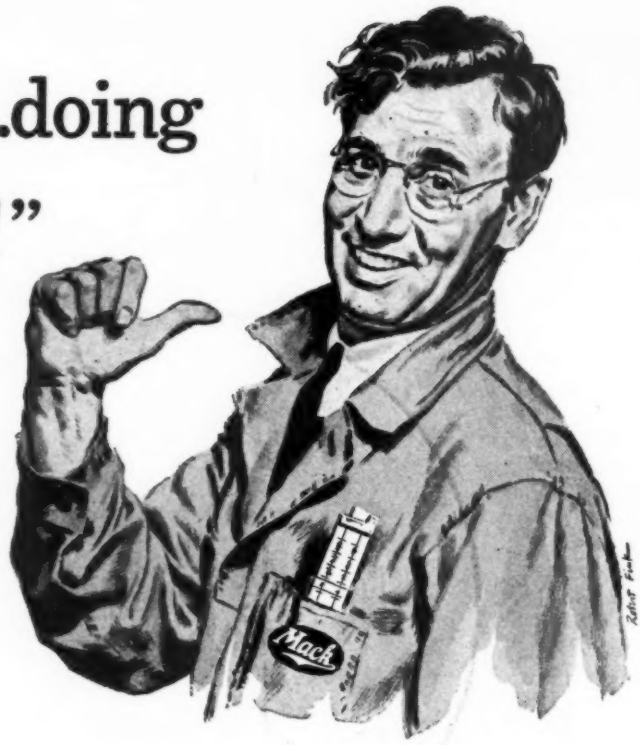

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2 . . . why a truck should be designed so that a repair man can reach the parts he wants without spending half a day just getting to them . . .

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Equipment Maintenance

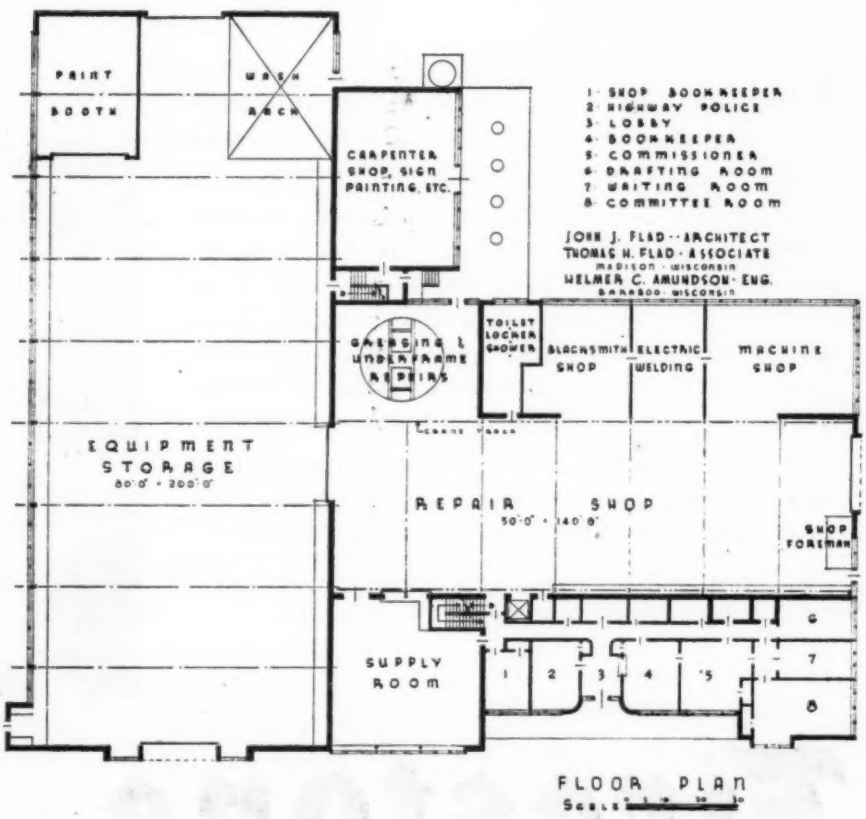
More Counties Need Modern Shops Like This

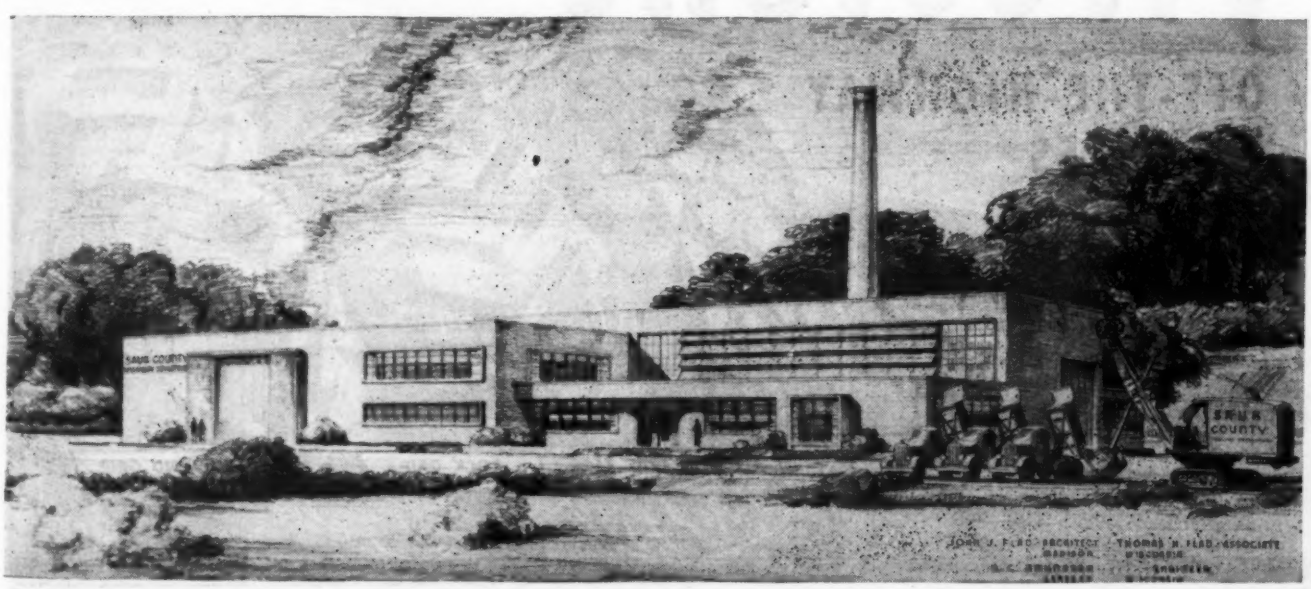
COUNTY highway officials who are planning to renovate, enlarge or replace their present shop buildings will look with envy at the proposed building shown here. This up-to-the-minute structure is designed to house all the functions of the county department under one roof. Its owner is to be the Sauk County Highway Commission, Baraboo, Wisconsin.

The building itself is modern in architectural appearance, and its brick walls have plenty of window space arranged for efficient daylighting and ventilation. The fire-resistant roof is supported by steel trusses and columns.

The average highway garage cries for floor space. This one has it aplenty—80 x 200 ft. of high-ceilinged space with wide, high doors (20 x 20 ft.) at either end which permits easy entry of heavy, "long-necked" equipment. Doors are of latest mechanically operated design, to save labor and time. Note convenient yet out-of-the-way location of the spray booth and paint rack room on one rear corner and wash room in the other.

Arranged "L" fashion, off from the storage room, is a shop 50 x 140 ft.




SAUK COUNTY
SAUK COUNTY
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FIRESTONE Off-the-Highway Tires cut operating costs because they keep right on rolling after other tires have taken the final count. Contractors have proven this on every kind of job everywhere.

They stand up under terrific punishment because of the materials and workmanship that Firestone puts into their construction. Bodies are made of the strongest rayon cord, Gum-Dipped for extra life. There are four extra plies to take impact blows. Sidewalls are double thick — an extra safeguard against rutwear and snags. The tread is strong, tough, cut-resistant.

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For the best in music, listen to the "Voice of Firestone" every Monday evening over NBC network.

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Preventive Upkeep at Scheduled Hourly Intervals

ANOTHER way of saying "A stitch in time saves nine" is:

"Practice preventive maintenance."

This is particularly true as regards earth-moving equipment, again reminds C. F. Zimmerman, General Service Manager, R. G. Le Tourneau, Inc., writing in this firm's publication, "The Co-Operator."

A few hours spent in preventive maintenance at intervals will keep equipment running, and will prevent a far greater number of hours being spent later making costly repairs.

Army Officer Writes:

Lt. D. E. Peiser, Heavy Equipment Officer with the U. S. Army in Burma, is quoted as saying: "You cannot possibly overstress the importance of operator care, the importance of cleaning equipment, tightening bolts, making proper adjustments, and all the rest, the importance of instilling a sense of pride in the operator for his machine."

This is but one of many letters we have received from men in military service telling how preventive maintenance pays dividends.

And that's correct, agrees Mr. Zimmerman. If you want to do the job right—soldier and civilian alike—if you want to keep equipment running all day long, week after week, set up a well-planned preventive maintenance program, and stick to it.

Follow Instruction Books

Instruction books which accompany all equipment should be of great assistance in setting up a maintenance program. For example, hour intervals at which various points on a machine should be serviced, amounts and types of lubricants to be used, methods of checking adjustments, etc., are specified in these instruction manuals. By using the information as a guide, a complete schedule for checking and making adjustments can be worked up to follow the manufacturer's recommendations, and which also can meet individual working conditions on any job.

With earthmoving machinery, a preventive maintenance program is usually set up on an hourly schedule, rather than on miles traveled. However, take into consideration that a high-speed, earthmoving rig (such as a Tournapull), travels many more miles than a slower speed crawling tractor during an hour's work. This requires that some points be checked at more frequent hour intervals than corresponding points on slower speed units.

Fix Responsibility

If preventive maintenance is to be practiced correctly and at regular intervals, responsibility for carrying out maintenance procedures must be assigned a man (or men) who take an interest in the machines, and who understand the importance of equipment being kept in good condition. Many important points of preventive maintenance can be missed or go unnoticed until serious trouble develops if no one person is made responsible for seeing that proper maintenance steps are taken.

A self-prepared check list covering all points of maintenance to be performed at specified intervals can be used to good advantage by those responsible for carrying out the preventive maintenance program. This insures that no points of maintenance are missed.

▼

(*Continued from page 95*)

in area. This shop, of necessity, will be unusually complete as county shops go, since Wisconsin counties have an exceptionally large mileage of roads to maintain, including trunk lines, and a heavy snow removal job in the bargain.

Floor areas or rooms for specialized work are arranged along one side—greasing and under-frame work, blacksmith shop, electric welding shop, and machine shop. The shop crane is 10-ton capacity. A minimum clearance of 20 ft. is provided throughout the shop, and also in the spacious store room which is located so as to be equally convenient to garage, shop or office.

The boiler room is in a two-story wing, the second story being assigned as a carpenter and sign shop.

Looking to the day when the organization will again be fully manned, the office rooms provide separate space for a considerable drafting force, as well as for bookkeeping, committee room, and private offices.

Greasin' time on an access road job near Knoxville, Tenn., where Nello L. Teer Co. of Durham, N. C., is subbing the grading for a 3-mi. 4-lane road; Ballenger Paving Co., Greenville, S. C., prime contractor

The highway police will also have headquarters here, including a radio room.

Not the least in importance, there is also to be a recreational room for employees, and modern toilet, shower and locker facilities.

Sauk County's new highway headquarters was designed by John J. Flad, architect, and Thomas H. Flad, associate, of Madison, Wis., and Helmer C. Amundson, engineer, of Baraboo. R. B. Kenney is county highway commissioner.

▼

Canada Wants Highway

Construction of a highway to Alaska through British Columbia to develop northbound trade can only be accomplished by the combined efforts of Canada and the United States, Premier John Hart announced following a conference with a special committee from Washington state. The premier advised the Americans that construction of the highway was one of the major items to be taken up with federal authorities.

Diagnosing Truck Trouble

Pass these items along to your shop foreman or mechanic. They will be specially helpful to that new helper you're breaking in.

THE following concise check-list is reprinted from the Studebaker manual, "Maintenance Information for the Delivery Truck Operator" (1945 edition). Most of these items apply to trucks of all makes, and are presented by this manufacturer in the interests of public service. They are so worded as to be of valuable assistance to the truck owner who leaves heavy repairs to service stations and has merely a handy man on minor repairs; as well as to one with his own expert mechanics. A copy of the complete 48-page manual can be had by writing The Studebaker Corporation, Truck Dept., South Bend, Indiana.

Following are excerpts from the chapter on Engine Diagnosis:

Unequal or Loss of Engine Compression

Description — Unequal compression between cylinders can often be detected by listening to the exhaust at the rear of the truck when it is standing and the engine running at a speed equivalent to a road speed of 15 and 20 mph. Unequal compression will give an uneven exhaust. Items affecting ignition and carburetion should also be checked to definitely determine that a compression loss is occurring before any corrective measures are undertaken. A loss of compression in all cylinders can be generally detected by a decrease in power, speed and acceleration. It is important, however, that a compression gauge be used to accurately determine the compression before proceeding with corrective work.

Test—A pressure gauge should be used in determining the compression pressure of the various cylinders. Remove the spark plugs and thread the pressure gauge into the spark plug hole of each cylinder. With the carburetor throttle open, crank the engine by use of the starting motor and make a note of the maximum pressure indicated on the gauge. After the gauge readings have been taken for all cylinders the check may be repeated, if desired, by placing a teaspoonful of engine oil in the spark plug holes of all cylinders. If the pressure indicated on the gauge shows a decided increase, the difficulty is probably due to a compression loss past pistons and rings as the added oil is acting as a seal. If the pressure does not increase over the initial readings, improperly seating valves are at fault. A head gasket leakage between two cylinders will be indicated by a low pressure reading for the two adjacent cylinders.

A weak cylinder can also be detected by the sound of the starting motor, as the starting motor speed will increase when cranking against the weak cylinder.

Causes

1. Improperly seating valves.
a. Valves holding open due to insufficient tappet clearance.
b. Sticking valves.
   1. Insufficient stem-to-guide clearance.
   2. Gum or carbon deposits on valve stems and in valve guides.
c. Warped or broken valve heads or bent valve stems.
d. Burned, pitted or distorted valve seats.
e. Weak or broken valve springs.

2. Compression loss past pistons and rings.
a. Excessive clearance between pistons and cylinder walls.
b. Eccentric or tapered cylinder bores.
c. Scored cylinder walls.
d. Scored pistons or piston ring faces.
e. Insufficient piston ring end gap.
f. Piston rings stuck in ring grooves. (Gum or carbon deposit.)
g. Insufficient piston ring tension.
h. Excessive clearance of rings in ring grooves. (Worn grooves or undersize rings.)

3. Cylinder head gasket leakage.
a. Faulty head gasket.
b. Loose cylinder head cap screws.
c. Incorrect type of gasket.
d. No gasket seal.
e. Spark plug gasket leakage.
f. Warped cylinder head.

Engine Misfires When Idling, Normal Engine Temperatures

Causes

1. Improper carburetion resulting from:
a. Float level too high.
b. Float level too low.
c. Restricted or partially clogged idle air passage or jet.
d. Air leak occurring between upper and lower carburetor body around idle tube.
e. Air leak occurring around the carburetor throttle shaft.

2. Air leaks in intake manifold or carburetor resulting from:
a. Loose manifold connections or leaks occurring in vacuum lines.
b. Loose manifold nuts.
c. Broken or damaged intake manifold or carburetor gaskets.
d. Crack in manifold.
e. Warped or damaged manifold contacting surface.

3. Improper ignition.
4. Weak ignition coil.
5. Spark plug difficulties.
6. Uneven compression.
7. Heat control valve held open or weak control spring.
8. Unusual Causes:
a. Slight water leaks occurring in the cylinder or combustion chamber.
b. Slight leakage occurring at check valves in the fuel pump.
c. Air leak occurring around the intake valve stem due to excessive valve-stem-to-guide clearance.

Connecting Rod Noises

Description—Connecting rod noises are usually a light pound or knock of much less intensity than main bearing

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knocks. The noise is usually evident with the engine idling and becomes louder when the engine speed is slightly increased. On some engines connecting rod noise is most pronounced at a speed of approximately 30 mph. when running with light engine load. Connecting rod noises should not be confused with piston or piston pin noises.

Test—Connecting rod noise can best be located by short-circuiting the spark plugs. The noise can not generally be entirely eliminated by short-circuiting, but will be considerably reduced. If causes 2, 3 and 4 are causing the noise, it may be impossible to reduce the noise to any extent by short-circuiting; however, a slight change should be noted as each spark plug is shorted.

Causes

1. Excessive bearing clearance on crank pin (radial).
2. Insufficient oil supply.
3. Low oil pressure.
4. Badly diluted oil (thin).
5. Misaligned connecting rods.
6. Eccentric out-of-round, or tapered crank pin journal.

Piston Noises

The most common piston noise is "slap," due to the piston rocking from side to side in the cylinder. Piston slap usually causes a hollow, muffed bell-like sound, although in some engines a clicking sound is heard. Slight piston noises that occur with a cold engine, and disappear after the engine is warm, do not ordinarily warrant a correction. Piston ring noises generally cause a click, snap, or sharp rattle on acceleration.

Test—Some piston and ring noises can be reduced by short circuiting the spark plugs; however, with other noises, this method is sometimes confusing. Piston slap can be more accurately detected by driving the truck at low speeds under load. The noise generally increases in intensity as the throttle is opened and additional load applied. On some engines with very loose pistons, a piston rattle is encountered at speeds from 30 to 50 mph. when the engine is not being accelerated.

Piston and ring noises can be momentarily eliminated by putting one to two ounces of very heavy engine oil into each cylinder through the spark plug hole. Crank the engine for several revolutions with the ignition off, until the oil has worked down past the piston rings. Replace the spark plugs, start the engine and determine if the noise still exists. If not, the noise is probably due to one of the following causes. (As the engine operates for a short time the oil will get hot and run from the rings and pistons and the noise will recur.)

Causes

1. Excessive piston-to-cylinder-bore clearance.
2. Eccentric or tapered cylinders.
3. Insufficient piston pin clearance.
4. Connecting rod alignment.
5. Piston or rings interfering with ridge at top of cylinder bore.
6. Piston interfering with carbon accumulation at top of cylinder bore.
7. Piston interfering with cylinder head gasket.
8. Collapsed piston skirts.
9. Broken piston rings.
10. Excessive vertical clearance of ring in ring groove.
11. Pin hole out-of-square with piston.
12. Ring lands not properly relieved.

Piston Pin Noises

Description—The most common piston pin noise is the result of excessive piston pin clearance. This provides a sharp, metallic, double knock, generally audible with the engine idling and the spark fully advanced. On some engines, however, the noise is more noticeable at car speeds of 25 to 35 mph. Interference

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between upper end of the connecting rod and pin boss is difficult to diagnose and can be mistaken for a loud valve tappet noise.

Test—Allow the engine to run at idle speed with the spark fully advanced. In most cases, a sharp, metallic, double knock will be noted when the spark plugs are short-circuited in the cylinder with loose piston pin. The knock will become more audible when the spark plug is shorted. Retarding the spark will generally reduce the intensity of the knock. If the pins in all cylinders are loose, a metallic rattle will be heard which is impossible to short out in any one cylinder.

As piston, piston pin, and connecting rod noises are easily confused, it is suggested that the piston and connecting rod be removed and a bench test be made by feeling for piston pin looseness before actual corrective work is undertaken.

Causes

1. Excessive piston pin clearance.
2. Loose piston pin locking pin.
3. Piston pin loose in upper end of connecting rod.
4. Piston ring rubbing cylinder wall.
5. Connecting rod and rubbing piston pin boss.
6. Insufficient piston pin clearance. (Causes piston slap.)

Thoughts on Keeping Bolts Tight

(From the Editor's Notebook)

As told by a Contractor's Yard Manager: "A good operator should watch his machine and keep it tightened up. We have tried sending out a shop man now and then to look them over, but what I'd like to do is have a traveling inspector keep going around on the jobs and checking up. I think it would pay in eliminating a lot of breakdowns."

From a Contractor's Equipment Superintendent: "I try to avoid looseness in our machine, from vibration or whatever cause, by putting in body-bound bolts. When we get new equipment I try to put in as many such bolts as possible and then wire them tight. By wiring them I mean drilling a hole through the bolt up as close as possible to the nut and then putting the wire through to hold the nut in place. I always do that in replacing bolts. I do that even with studs. If I can't do that, I sometimes use jam nuts.

You see, in production, when they make these machines, they allow maybe 1/32" clearance over the size of the bolt. That allows the bolt to start working loose due to the vibration. So in putting the new machine together, I ream out the bolt hole wherever I can to the next larger size and put in a body-bound bolt. Then instead of having any clearance they fit exactly. For a ¾" bolt I ream a ¾" hole and then force in the bolt. It keeps the machines tight and lessens the chance of bolts breaking, due to wear."

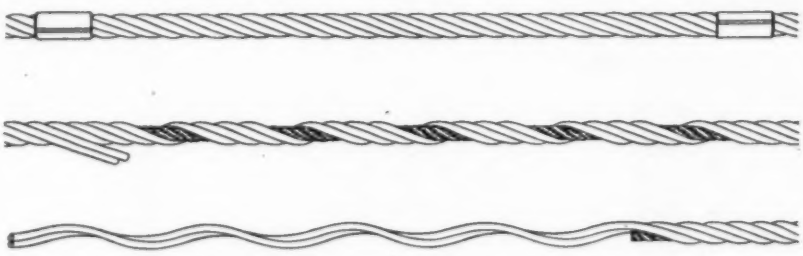
▼

Engineers Salvage Giant Shovels

One of the biggest single salvaging jobs undertaken by the Corps of Engineers was the repair of five 120-B Bucyrus-Erie, five cubic yard, electrically operated, combination draglines and shovels. These five giant shovels had been used in important construction on the Panama Canal and had become badly worn through heavy use and exposure to the tropical climate.

Their work done in Panama, the giant shovels, costing $80,000 apiece, were needed elsewhere. Standing 27 feet from the ground to the top of the cab, each shovel has an 80-foot boom. Thirty-seven flat cars were required to transport the five shovels from the West coast to the Missouri River Division Engineer Repair Shop at Kearney, Nebraska.

Special concrete aprons were poured to provide outdoor work areas for the repair of the machines which were too large to be taken inside the shop. Special drying ovens were also required to handle the electrical motors and parts. All bronze bushings and other parts not readily available were made in the Engineer Repair Shop. At the end of 120 days—good time for a job of that sort—four of the shovels were rebuilt and the fifth was sold to an American coal mining company for $55,000. Three of the rebuilt shovels were shipped to the Pacific for quarry work and one to Australia for coal stripping.



Rereeving a New Wire Rope

When replacing an old and worn rope with a new one, on any machine which requires pulling the new rope through blocks, over sheaves and on to drums,—here is an idea that will save not only time and temper but money and profanity.

From the end of the old rope, unlay and remove four of the six strands to a distance of about two or three feet. Similarly remove two of the six strands from the new rope to be installed.

Splice, or more properly speaking "lay" the two together and tape the ends to prevent unravelling. This will permit the new cable to be pulled through blocks and pulleys and reeved rapidly, accurately and easily.

This, of course, can be done only with preformed wire rope, since it is only that type of wire rope with strands which will lie inert. It is hardly feasible to attempt to remove the seizing wires and attempt this procedure with non-preformed wire rope, which flies apart when cut.

Peak Performance

CP PORTABLE COMPRESSORS

Design refinements in CP Portable Compressors assure 15% to 35% more air per gallon of fuel. Speed varies with air demand — not by steps, but gradually — resulting in marked fuel economy and reduction in wear. CP Portables are available in gasoline-powered models of 60, 105, 160, 210 and 315 c.f.m.; and in Diesel-powered sizes of 105, 160, 210, 315 and 500 c.f.m.

CP CLASS O-CE STATIONARY COMPRESSORS

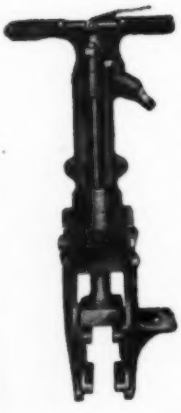
Ruggedly built and conservatively rated, CP Class O-CE Horizontal-Duplex Motor-Driven Air Compressors meet every requirement of heavy-duty, day-after-day service. They are available in capacities up to 10,000 c.f.m. Other CP Stationary Compressors are also available in vertical and horizontal designs for steam, belt and electric motor drive in a wide variety of capicities and pressures.

CP-42 SINKER DRILL

Fast drilling speed, strong rotation and good hole-cleaning qualities make the CP-42 Sinker the preferred tool for shaft sinking, quarry drilling, general excavation and road work. Low air consumption makes it particularly suited for portable air compressors.

CP-115 DEMOLITION TOOL

Weighing only 59 lbs. with latch type retainer and 55 lbs. with spring type, gives outstanding performance for a medium weight tool. Valve-actuated, it operates smoothly with minimum kick back. Full cushioning eliminates need for side rod springs — protects the head from punishment in "breaking through." Gooseneck air inlet prevents the operator's hand from catching in swing of hose.



CP-116 SHEETING DRIVER

Essentially the popular CP-116 Demolition Tool with a special front head for driving sheet piling, CP Sheeting Driver has only one moving part, the piston, which strikes a fast powerful blow. As it does not "broom"—sheeting can be used over and over.

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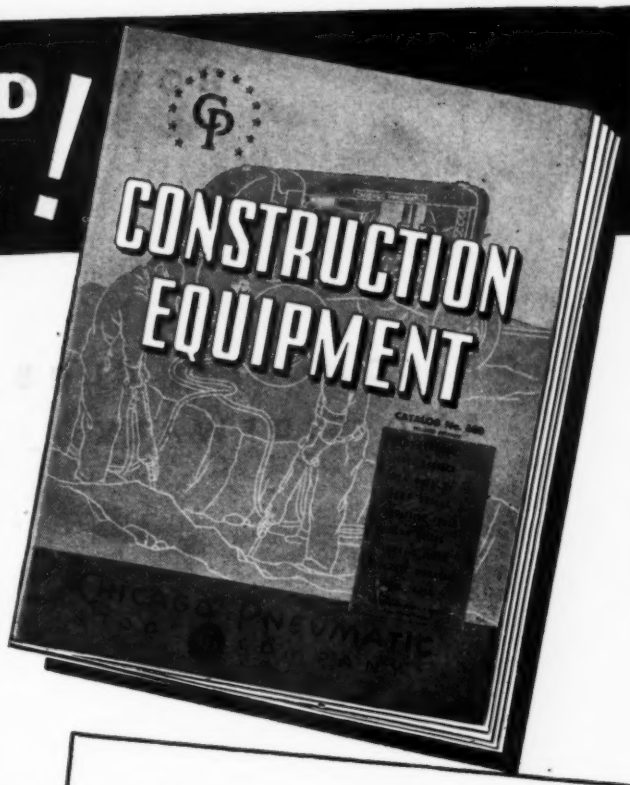
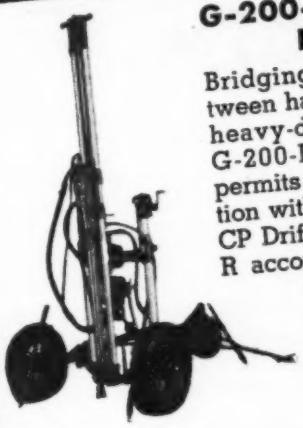


For over 45 years, contractors in all parts of the country have looked to CP for plus performance in Air Compressors, Rock Drills, Pneumatic Tools and other equipment. In today's man-power shortage, the efficient, trouble-free, easy operation of CP equipment is of special importance. Geared to give maximum service with minimum maintenance, CP equipment is the choice for increased profit now — and in postwar construction. Ask for a copy of Catalog No. 600, giving complete information concerning CP line of contractors equipment.

G-200-R WAGON DRILL



Bridging the gap between hand sinkers and heavy-duty CP G-500, G-200-R Wagon Drill permits one-man operation with most powerful CP Drifter Drills. G-200-R accommodates 6-foot steel changes; 18 to 24-foot steels are easily handled.

CP SUMP PUMP

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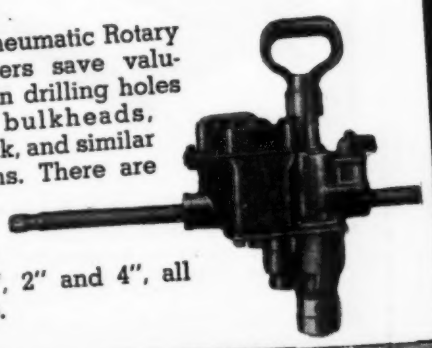
CP BACKFILL TAMPERS

In trench work particularly, CP Backfill Tampers quickly earn their cost by saving the time and labor involved in hauling surplus excavated material. For general tamping, CP-3 is recommended; for heavy tamping, CP-MM; for extremely heavy tamping, CP-4.

CP ROTARY WOOD BORERS

Chicago Pneumatic Rotary Wood Borers save valuable time in drilling holes in piers, bulkheads, trestle work, and similar applications. There are three sizes of CP Wood Borers, 1", 2" and 4", all reversible.



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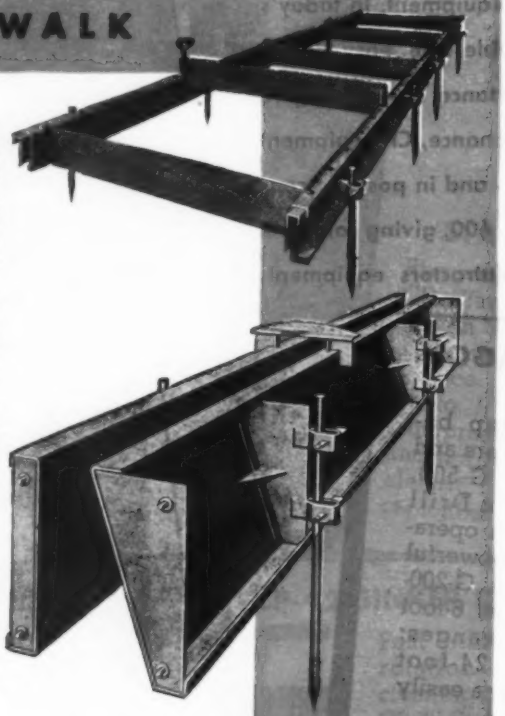

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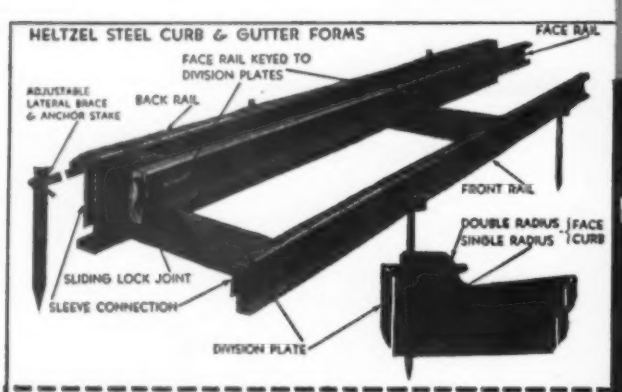

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New Equipment and Materials

Insley Delivers First Excavator Sold to Civilian Since 1942

The Insley Manufacturing Corporation, Indianapolis, Ind., which for three years has produced shovels and cranes entirely for the armed forces, early in July delivered its first Insley excavator to a civilian buyer since 1942. The unit, an Insley ½-yd. Model K-12 with trench hoe attachment, similar to hundreds of Insley Excavators which have seen action on battlefronts all over the world, was sold to

Delivering First Insley Excavator to Civilian Buyer

the Jacob Day Excavating Co., of Indianapolis. Shown taking delivery of the unit from George J. Dimond (right), Insley sales manager, is Jacob Day (in cab). Jack Hunt (left), of Reid-Holcomb Co., Indianapolis, distributor for Insley products throughout Indiana, made the sale. Insley, which still is manufacturing scores of excavators for the navy, recently was authorized to sell its surplus production to civilian users upon authorization of WPB.

▼

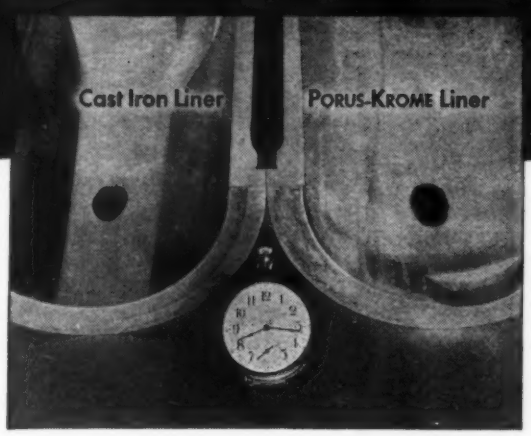
New Electrode

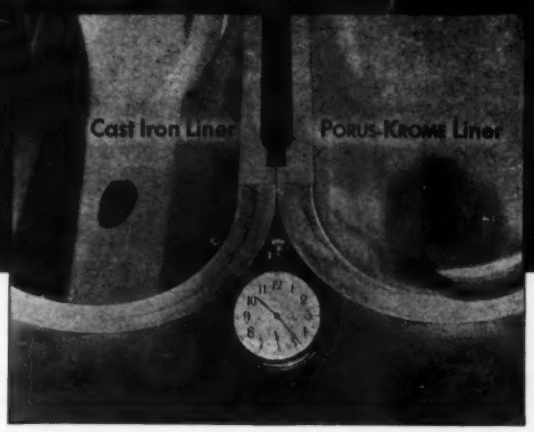
A new heavy coated hard surfacing electrode, designated as "Tufanhard" has been developed by Hobart Brothers Co., Troy, O. It is made in three grades, "600," "400," and "250" which corresponds with the Brinnel hardness of deposited metal. It is stated that while "Tufanhard" produces a hard alloy weld, it has all of the ease and smoothness of operation ordinarily attributed to a heavy coated mild steel rod. It can be used in all positions with no more skill than is required by the so called "cold" rod. The welds can be made continuously with overlapping beads without the necessity of removing the slag, and the low spatter loss and smoothness of bead requires only a small amount of grind-

Here's one reason why

PORUS-KROME

multiplies cylinder life





The porosity of PORUS-KROME assures better lubrication. The tiny pores and channels in its surface serve as reservoirs for lubricating oil, feeding it back to the surface as needed. PORUS-KROME "wets" with oil many times better than cast iron does . . . and these photographs demonstrate that the rate of dispersion is a function of porosity.

Drops of oil (as shown above) are placed on a conventional cast-iron liner and on a liner which has had PORUS-KROME applied by the patented Van der Horst process. Both have been honed to the same degree of smoothness. The time is noted.

Two hours later. We see in the photograph on the right that the oil has dispersed only slightly on the cast-iron surface. On the PORUS-KROME liner, the oil has dispersed over a much larger area.

This, combined with the other characteristics of PORUS-KROME, enables it to multiply the life of cylinder liners from 4 to 20 times . . . and at the same time multiply the life of ordinary rings 3 to 5 times.

In addition to providing a "long-life" cylinder wall surface, PORUS-KROME has many diversified applications. If you have troublesome wear problems on any parts of your machines or equipment, or are seeking a way to give your customers an added value in your products, Van der Horst engineers may be able to supply the solution for you. Write today telling us just what your problems are . . . no obligation, of course. Van der Horst Corporation of America, Olean, N. Y. Plants in Olean and in Cleveland, Ohio.

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serve today on All Fronts

● This Erie 2-Line Clamshell has been selected by the U.S. Army and Navy to serve on all fighting fronts. They combine block and tackle plus leverage to achieve the greatest digging force available in a clamshell design whether reeved 2, 3 or 4 parts of line. Write for new bulletin. Address: 358 Geist Road

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WIRE MESH
Slab reinforcement keeps cracks closed and holds slab together.

DOWEL SPACERS
Assures correct alignment and simple installation of shear dowels.

CENTER JOINT
For controlling longitudinal cracking of pavement.

Specify Them!!

REPORTED HIGHWAY RESEARCH INDICATES STEEL REINFORCEMENT IS NECESSARY IN PAVEMENTS FOR LONG LIFE AND LOW MAINTENANCE.

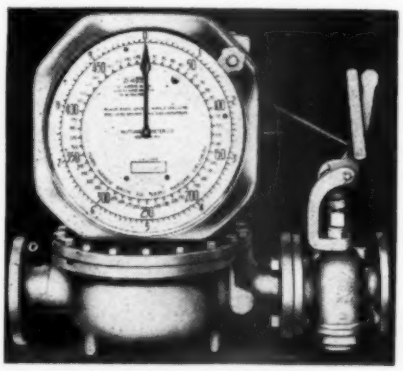
LACLEDE STEEL COMPANY
ST. LOUIS, MISSOURI

ing in finishing, making it very economical to use. The deposit can be heated and drawn to any temper within the range of the type rod used. The electrode will operate on either alternating or direct current, straight polarity being recommended when using D. C. machines. Electrodes are made in 14 in. lengths, in ⅛ in., 5/32 in., 3/16 in. and ¼ in. sizes and packed in 5 lb. and 25 lb. cartons.

▼

Meter for Batch Mixing of Cement

A meter equipped with an auto-stop tripping mechanism for the accurate batch mixing of cement is a product of the Neptune Meter Co., 30 Rockefeller Plaza, New York 20, N. Y. The meter can be set to deliver just the right amount of water to a batch of cement and then shut off the water automatically. To operate, the tripping mechanism on the



Trident "Auto-Stop" Meter

meter is first set for the number of gallons, or other measure of water that the batch will need. This setting is clearly visible in the window located on the meter dial. Then the valve is opened. As soon as the correct quantity of water has been delivered to the cement mixer, the tripping mechanism automatically shuts the valve. The flow can be stopped manually at any time without impairing the accuracy of registration. When started up again, the meter will finish delivering the water required. Meter setting can be changed in the middle of a batch. Available in sizes for 1 in., 1½ in. and 2 in. pipe and set in increments as low as 1 gal.

▼

New Hydraulic Flow Equalizer

Positive equalization in either direction of two unequally loaded hydraulic actuating cylinders is now possible with the Bendix hydraulic

CUT MAINTENANCE COSTS—TIME WITH P&H WELDING ELECTRODES

Take advantage of the time, money and machinery saving benefits of arc welding! Use P&H Welding Electrodes for the repair and maintenance of your equipment . . . to keep it on the job longer . . . to avoid lengthy lay ups for want of replacement parts. Often a few hours of welding time saves days.

Whatever your welding requirements—P&H can supply you. There are all types and sizes—AC or DC—for welding all kinds of steels and for building up and hard-surfacing to provide unusual resistance to wear, impact and abrasion.

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"SURE PRIME" PUMPS

Improvements developed in building more than 50,000 pumps for toughest military service are now offered in these latest "Sure Primes" including complete all-weather protection of pump and engine in all-heavy duty models from 2" to 10" size. SEND FOR NEW CATALOG showing postwar features of design and performance in the world's biggest selling line of contractor's pumps.

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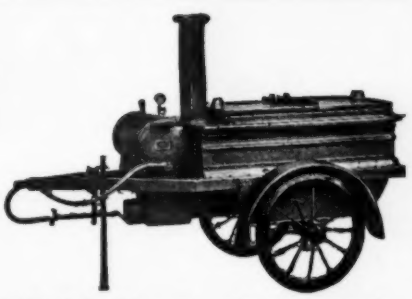
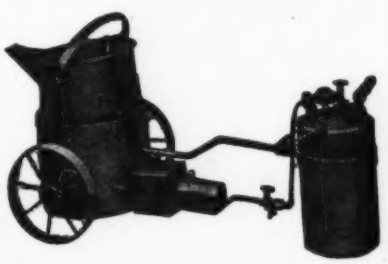
For speedy heating of tar and asphalt—



Use this CONNERY oil-burning Patrol Patching Heater on the *small* job and this CONNERY oil-burning kettle for *large-quantity* production.



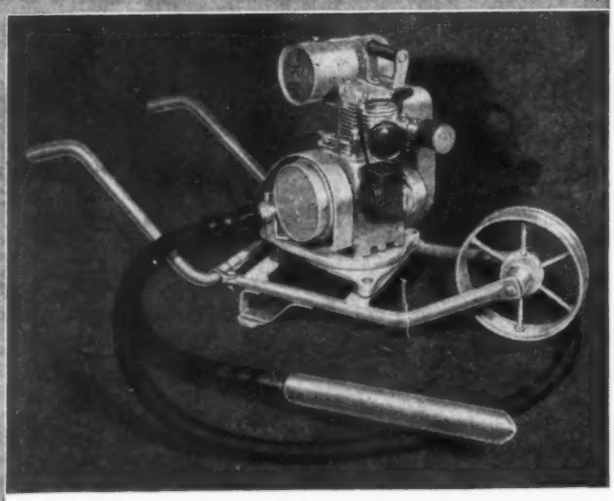
Write for catalog showing our full line of tar and asphalt heating kettles, spraying attachments, pouring sets, etc.

CONNERY CONSTRUCTION Co.
3500 North Second St. Philadelphia, Pa.

VIBRATORY Equipment for EVERY TYPE of CONCRETE CONSTRUCTION

JACKSON FLEXIBLE SHAFT MODEL FS-6A

A very dependable independent unit, gas engine powered. Up to 7500 V.P.M. 3 heads for thick and thin sections. Flexible shafting in 7 ft. to 14 ft. lengths up to 28 ft. Automatic clutch. Swivel dirt-proof base. Wheelbarrow optional.



Our long famous **"JACKSON"** line is comprised of time-tested, thoroughly dependable vibrators (internal and external types) ideally applicable to every type of concrete construction and placement: dams, bridges and buildings, floors, walls, columns, pavements and pipe manufacture; also many vibrators which may be adapted with great advantage to the conveying, movement or packing of various materials. To get the vibratory equipment which will show you the greatest possible return on your investment, write, stating your particular problems. We will be glad to give you the benefit of our many years of experience as specialists in the application of high-frequency vibration. Get the facts! It involves no obligation whatsoever.

JACKSON FLEXIBLE SHAFT VIBRATOR MODEL FS-4A

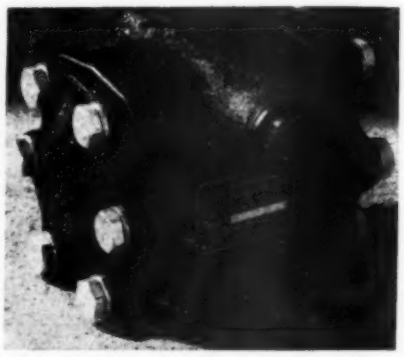
Excellent for thin walls, tight, harrow places, and between reinforcing. 110-120 volt AC., DC. 6500 V.P.M. Head 1-13/16" x 17" or 10". Shaft lengths 24" 39", 7 ft. and 14 ft. Lightweight motor, easily held by operator.

JACKSON HYDRAULIC VIBRATOR MODEL HS-A1

A husky, dependable concrete vibrator for general use. Oil-powered, gas engine hydraulic pump drive. 4000 to 7000 V.P.M. Vibrator head 2¾" x 21". Quickly fitted with head for wet or dry rubbing.

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

flow equalizer, manufactured by Pacific Division, Bendix Aviation Corporation, North Hollywood, Calif. The flow equalizer is stated to completely eliminate the necessity for mechanical interconnection or for two pumps. It is only necessary to replace the "T" in the pressure line from the control valve with the equalizer. Such an installation in a double acting system will accurately equalize the flow from one line into two branch lines, and in the reverse flow from two branch lines into one line. The metering is



Bendix Hydraulic Flow Equalizer

automatic and foolproof. The unit incorporates a balanced metering piston, and does not depend on outside mechanical action as the proportioning agent. There are no adjustments to be made. An exclusive variable orifice controls equalization over a wide range of flow, and the equalizer can be used with most types of fluid. With simple modification the unit also is available as a proportioner and will split the flow into two lines with predetermined greater flows in one line than the other. Operated in the reverse direction it will combine two such uneven flows, constantly maintaining the specified proportion between the two lines. Complete data on the Bendix Flow Equalizer is available in Bulletin BE-100. Write Pacific Division, Bendix Aviation Corporation, North Hollywood, Calif.

▼

New Lubricant

A new internal combustion engine lubricant has been announced by Carbide and Carbon Chemicals Corporation, a unit of Union Carbide and Carbon Corporation, 30 East 42nd St., New York 17, N. Y. This lubricant, which is now being produced in commercial quantities, is stated to have properties quite different in many respects from oils derived from petroleum. The new lubricant contains no petroleum oils. Its use in internal combustion engines has been studied

for several years in a large number of vehicles which have covered a total of over 1,500,000 road miles. Large quantities are being used in military equipment. It is claimed that the new lubricants practically eliminate sludge and varnish formation in the engine. Wear of the moving parts is in line with wear experienced with ordinary mineral oils. Ease of starting in cold weather is stated to be an outstanding advantage. At the present time, the sale of this lubricant is restricted to war uses.

▼

New ½-Yd. Shovel

A new pneumatic-tired combination crane-shovel-dragline unit has been announced by The General Excavator Co., Marion, O. This new Type 10 Model 105 is rated at ½-yd. as shovel, with quickly convertible front-end attachments for a complete range of construction, excavating and materials handling jobs. Optionally equipped with either four or six 10.00 x 20 tires, or with 14.00 x 20 rib tread tires for "off the road" service, and featuring air booster steering, the new rig is stated to be capable

Type 10 Model 105 Shovel

of highway cruising speeds of more than 20 mph. It conforms to major highway regulations and in most states needs no permit to travel over the roads. The new model has fully independent travel, and swing and boom at the "finger" touch of a lever —and activated by safe, positive, metered air control. Among other important advancements are optional 4-wheel drive; 4 speeds forward and reverse; easily accessible independent assemblies; self-counterweighting machinery; heavy-duty engine, transmission and clutches.

designed for Victory
Mobility is the key to Victory! "Get there first with the most!" applies in 1945 as it did in 1865!
Auto Diesels, Ltd. of Uxbridge, England designed the unit in the above illustration. It insures complete mobility over difficult terrain by mounting the Generator Set on four miniature caterpillar treads. These miniature treads proved as efficient for moving Generator Sets as the larger models were for giant Tanks! For quick starting and positive operation, they powered the unit with the famous Novo CW Gasoline Engine!
This Generator Set was designed for VICTORY because it was designed for MOBILITY . . . it was powered for VICTORY because it was powered by NOVO.
Novo gasoline engines range from 4 to 22 h.p., in 1, 2 and 4 cylinder models. For complete information, contact your Novo Distributor, or write to the factory.
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Self Priming Pumps
Hoists
Engines
Diaphragm and Pressure Pumps

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If motor troubles are jamming your operating schedules, it will pay you to put AMALIE H-D oil to work for your equipment at once.

AMALIE H-D is straight-run refined from 100% Pennsylvania Crude and has all the important characteristics of a *complete* heavy-duty oil. It has the necessary detergent quality . . . cleanses and washes away carbon and other harmful products of combustion. Its anti-oxidant action keeps oil from oxidizing and forming varnish and sludge deposits on vital parts.

Its strong, tough, corrosion-resisting film—20% *oiliness*—stands up under the toughest operating conditions.

Remember AMALIE H-D Oil — and don't forget regular AMALIE Pennsylvania Motor Oil and AMALIE Lubricants.

For Essential Trucks • Busses • Tractors • Construction Equipment

See your AMALIE Distributor For This A. C. D. S. Test

Your AMALIE Distributor offers you the opportunity to have the used oil from the crankcases of troublesome equipment tested and analyzed impartially by skilled laboratory technicians. AMALIE CRANKCASE DRAINALYSIS SERVICE has helped many contractors to put an end to costly troubles and lay-ups. No obligation.

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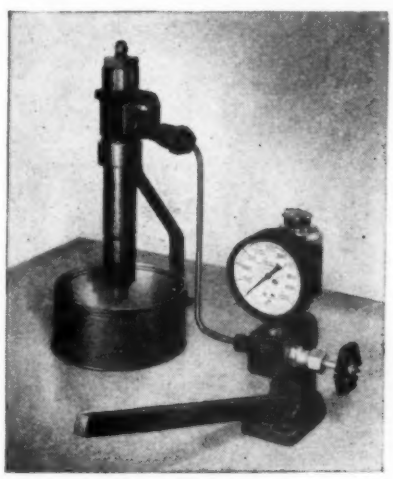
New All-Wheel-Drive Trucks

The Marmon-Harrington Co., Inc., Indianapolis 7, Ind., has announced that production will be started soon on new models of heavy-duty, all-wheel-drive trucks for civilian purposes. Production will be concentrated on two models—Model MH555-4 and Model MH 440-4. The larger of these, Model MH555-4, will be powered by a 131 h.p. engine, on a wheelbase of 161 in., with a permissible gross loaded weight of 27,000 lb. on 11.00 x 20 tires. Slightly smaller, Model MH440-4 will be powered by a 118 h.p. engine, on a wheelbase of 158 in., with a permissible gross loaded weight of 22,500 lb. on 10.0 x 20 tires. Both models will have 10 forward speeds and 4 reverse. Retaining the many well-known feaures which Marmon-Herrington has pioneered in the multiple-wheel-drive field — low center of gravity, greater approach angle, constant velocity steering end joints, etc. — these new all-wheel-drives will embody also numerous design and construction refinements arising out of the company's long years of experience in producing heavy-duty military and commercial vehicles. These improvements include new double-reduction axles, powerful air brakes, and a new steering gear design which makes for easier and more positive steering control. In addition to these new models, Marmon-Herrington is also getting back into production, for commercial purposes, on their all-wheel-drive conversions of Ford vehicles. They are now offering, for reasonably prompt delivery, conversions of 1½ ton standard Ford trucks to both four-wheel-drive and six-wheel-drive and conversions of the half-ton Ford pickup truck and station wagon to four-wheel-drive.

▼

New Diesel Nozzle Tester

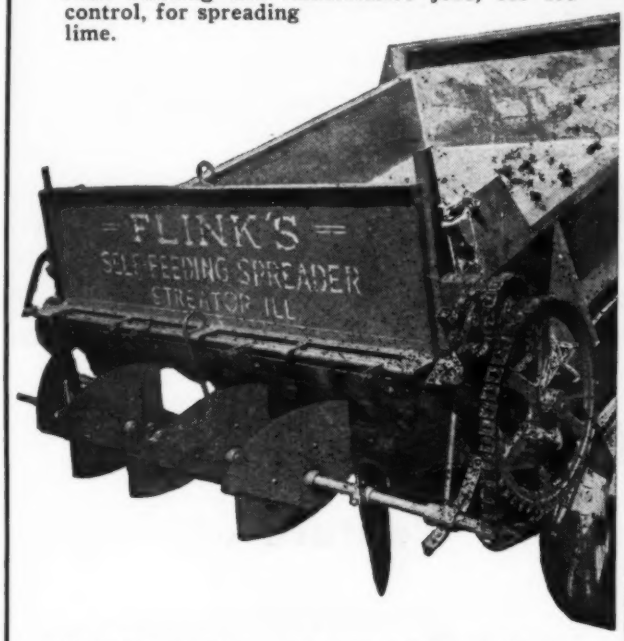
A compact, low-cost, portable nozzle tester, of particular interest to owners of diesel powered construction equipment, has been brought out by the Aircraft and Diesel Equipment Corporation, Chicago. The many uses of this, it is stated, include the checking of injector opening pressure, spray pattern, stuck needle valves, etc. Among the advantages listed are the speed and accuracy of the tests, the flexibility of use, simplicity of operation, and the elimination of possible damage to engine. Built by the manufacturers of Adeco fuel injection pumps, nozzles and nozzle holders, this dependable testing unit can be used on bench or engine, at pressures up to 10,000 p.s.i. It also can be used for testing hydraulic devices. A special bulletin presents full details including sectional and analytical drawings of this Adeco hand test pump, together with illustrations of various adaptor tubes for testing the various makes of injection equipment. Copy will be sent upon request to Aircraft and Diesel Equipment Corporation, 4415 N. Ravenswood Ave., Chicago 40, Ill.



Adeco Nozzle Tester

HOW FLINK ONE MAN *Material Spreader* DOES BETTER JOB

Spreads forward or backward, in even layers, wet or dry materials, thick or thin, as desired. Spreads full or half width of street. Efficiently handles all materials up to 1". Built for tough road building and maintenance jobs, for ice control, for spreading lime.



Flink spreaders do a better job for definite reasons:

1. POSITIVE AGITATION by rugged, simple, finger type agitators.
2. ADJUSTABLE GATES, set before spreading, give accurate control of amount spread.
3. HI CARBON STEEL FANS scientifically placed and angled, thoroughly "mix" material dropping through gates, deposit it in even layers on spreading surface. No thick and thin spots.
4. ELECTRICALLY WELDED. The Flink spreader is a rugged piece of commercial equipment, built of steel, for hard use.
5. FASTER. Spreads at 12 to 20 miles an hour. Can be operated by driver from cab who can throw spreader in and out of action as truck is in motion.
6. NO HELPER. The Flink is self-feeding. No shoveler on back to "rest up" or "warm up."
7. DOES NOT LIMIT USE OF TRUCK. Truck can be dumped same as with regular end gate or spreader can be replaced by original end gate in 5 minutes.

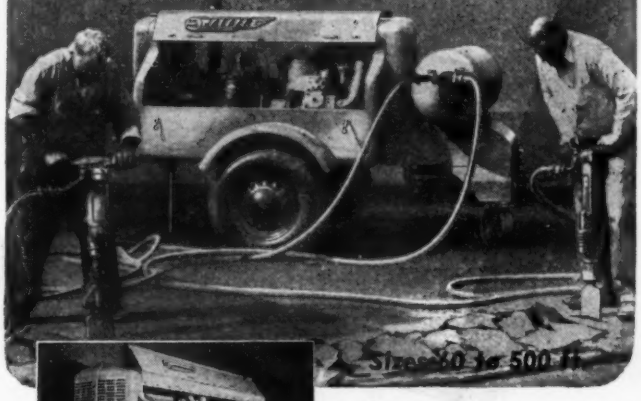
Write for literature.

The FLINK COMPANY

508 VERMILION STREATOR, ILLINOIS

AIR PLUS JAEGER COMPRESSOR

on thousands of jobs, Jaeger Compressors are delivering MORE air with LESS fuel



Let us show you how these big-valved compressors, built like aircraft engines, are out-performing prewar type machines. Ask for Catalog JC-5.

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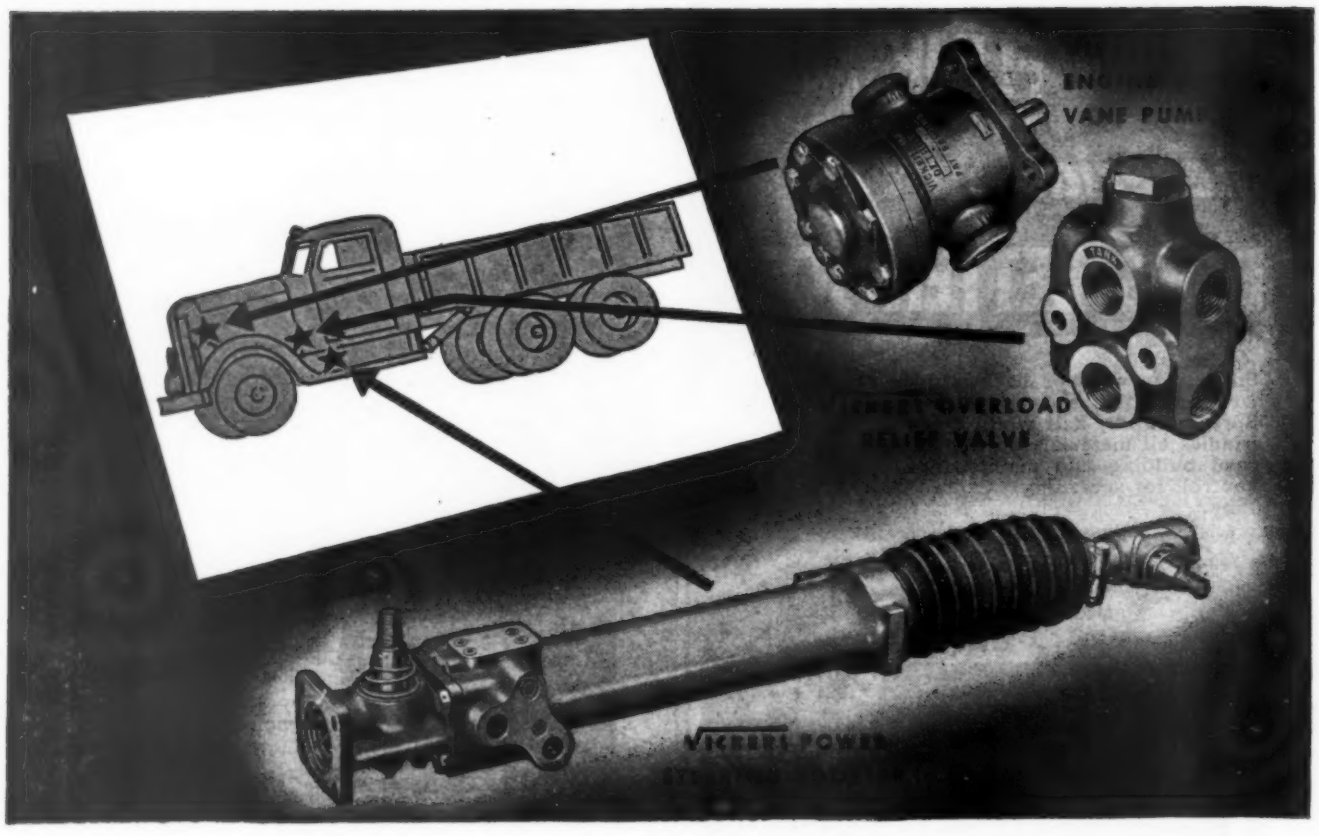

EASY INSTALLATION . . . Another Feature of

VICKERS HYDRAULIC POWER STEERING

Being compact and requiring a minimum of space for installation, the Vickers Hydraulic Power Steering System can be applied to most existing hand steering mechanisms with a few simple alterations. The separate and compact power cylinder (booster) can be located where it does not interfere with other apparatus and where the power will be applied directly to (and in line with) the drag link. No additional space is required at the end of the steering column where space is usually at a premium.

Other important advantages of Vickers Hydraulic Power Steering are: effortless, positive and shockless steering, automatic overload protection, reduced operator fatigue, greater road safety, automatic lubrication, and 14 years of operating experience. Bulletin 44-30 gives complete information about Vickers Hydraulic Power Steering; write for a copy.

VICKERS *Incorporated*

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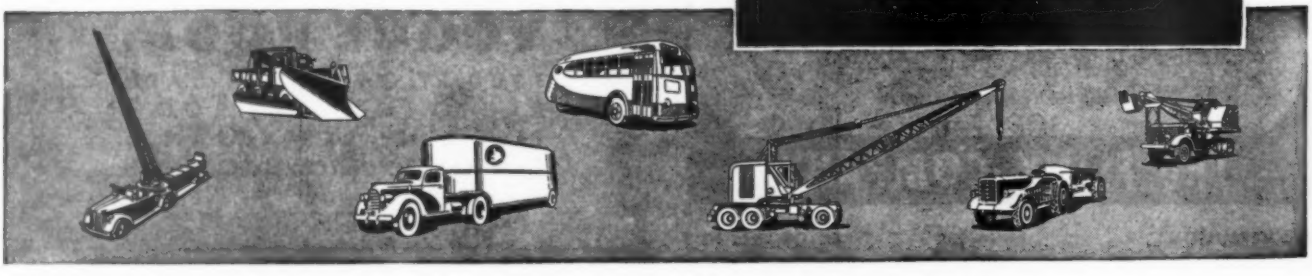
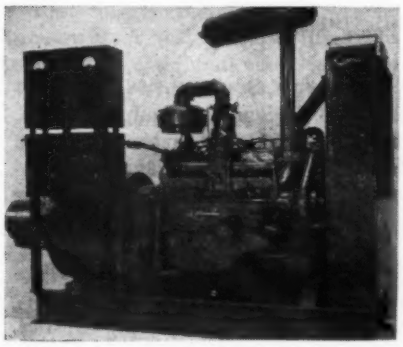
Representative Applications of **VICKERS HYDRAULIC POWER STEERING**



New 15,000 Watt Light Plant

A 15,000 watt Katolight plant has been added to the line of the Kato Engineering Co., Mankato, Minn. This is the Model 52 MPK 6, 15,000 watts, 120/208 volts, A.C. 60 cycle, 3 phase, 4 wire, 1,200 RPM., revolving field type Katolight generator powered by



Model 52 MPK6, 15,000 Watt

Model T-118 Chrysler 6 cylinder, 4 cycle watercooled engine. The unit is 70 in. long by 49¼ in. high by 24⅜ in. wide. The approximate weight is 1,860 lbs. and the shipping weight approximately 2,075 lb. The unit can be furnished with weather proof housing if desired.

▼

Gummed Plastic Plate for Road Markers

A gummed plastic plate that is claimed to adhere and make a permanent bond to any clean surface when moistened with any solvent such as benzine, naphtha, etc., has been developed by the Pennsylvania Plastic Corporation, 5025 Liberty Ave., Pittsburgh, Pa. The advantages claimed for the plastic include: Permanent bond, will adhere to any shape or curved surfaces, eliminates cost of drilling, screws and drill jigs, adhesion is not affected by weather conditions. The plates are said to have many applications including their use as roadside markers, direction signs, etc.

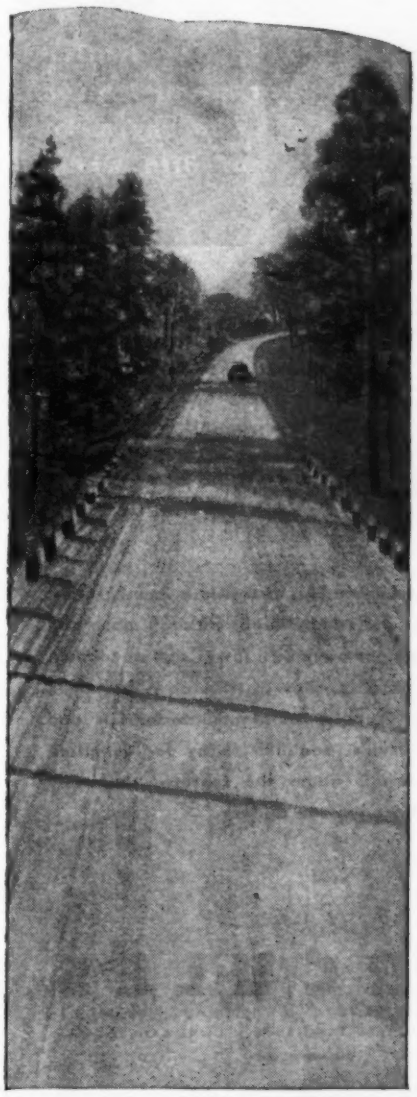
▼

New Wheel Tractor

Officials of The Oliver Corporation met recently in Cleveland to review the progress being made in the development of their postwar line of industrial models of Cletrac crawler and Oliver wheel type tractors, together with allied equipment. Among those in attendance were Alva Phelps, President; W. King White, Vice President; Merle S. Tucker, Vice President; O. E. Eggen, Director of Engineering; W. E. Miles, Sales Manager, Industrial Division; L. C. Daniels, Chief Engineer; L. H. Grutsch, General Plant Manager; H. W. Davis, Assistant Industrial Sales Manager; B. T. Eagerton, Export Department of The Oliver Corporation. The first of the wheel models to be sold through the industrial organization is now available—the Model "70," a 6-cylinder tractor of 36 engine h.p. The Models "80," "60" and "99" will be added to the line soon and a complete line of allied equipment will be available as soon as development can be completed at the Cleveland plant by the Engineering Department in co-operation with the Industrial Sales Division.

Model "70" Tractor

STRETCH FEDERAL AID *the Calcium Way*



Government financial support has been provided for postwar secondary roads as well as roads where traffic counts justify paving. How many miles you get depends upon how you use the money.

Low-cost roads need not be poor roads. In fact, some of the finest roads in the country are built the calcium chloride way with local soil materials such as gravel, stone or shell aggregate bound together with moisture provided and retained by calcium chloride.

The use of local aggregates and binder soils consolidated and held moisture bound with calcium chloride, also provides a market for local labor. Best of all, it provides an all-weather road that stays firm in bad weather, resists frost action and is dustless in summer, rain or shine.

Write today. Ask for Bulletins showing the calcium chloride way to low-cost, postwar roads.

•

Calcium Chloride Association
4145 Penobscot Building
Detroit 26, Michigan

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FOR THE BIG JOBS!

For any trailer or semi-trailer with any make of fifth wheel

On the heavy, tough jobs—that's where a Hercules body proves itself! Big loads, punishing service, continuous operation . . . that's the type of work where Hercules' built-in stamina shows up. Designed and built for heavy-duty service, Hercules dump bodies are available for installation on any make of trailer or semi-trailer.

Collect dividends through more and bigger payloads, lower cost operation. Your Hercules distributor is prepared to supply complete information and service. See him today for complete details about the features that only Hercules can deliver.

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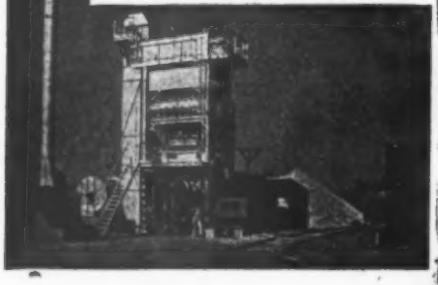
DUMP BODIES AND HYDRAULIC HOISTS
SPLIT SHAFT POWER TAKE-OFFS • COAL CONVEYORS

Ask About Turn-O-Matic Cement Boxes for Bulk Cement—Now Available—Write Today!

HERCULES STEEL PRODUCTS COMPANY . . . GALION, OHIO

PORTABLE ASPHALT PLANTS
High Production—Low Cost



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NORRISTOWN, PENNA.

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VULCAN PAVEMENT AND CLAY DIGGING TOOLS

ARE MADE in a complete line of sizes to fit all standard compressed air hammers.

Send for NEW Vulcan illustrated CATALOGtoday.

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QUINCY, MASS.

Obituaries

OTTO K. PHILLIPS, 55, acting director of public works of Flint, Mich., was drowned July 25 while on an inspection trip. He had been connected with the city engineering department since 1917.

▼

CLEMENT F. SCULLEY, 57, President Clement F. Sculley Equipment Co., St. Paul, Minn., died last month in St. Paul. He had been engaged in highway contracting for the past 25 years.

▼

JAMES H. FLYNN, 60, acting bridge engineer, Michigan State Highway Department, died July 13, in Lansing, Mich. He joined the highway department in 1933. Previous to that he was a member of the contracting firm of Gosner & Flynn, Dearborn, Mich.

▼

PETER J. HIGGINS, 85, old time railroad grading contractor, died recently in Billings, Mont. The contracting firm composed of his father and six brothers carried out many railroad grading jobs in Wyoming, Montana, Colorado and other states.

▼

PAUL L. BROCKAWAY, 66, city engineer of Wichita, Kan., for 26 years, died July 20, in Wichita. He joined the Wichita engineering staff in 1907, becoming city engineer in 1917.

▼

LARRY COLUCCIO, 57, owner of L. Coluccio Co., Seattle, Wash., died July 31, in Seattle. He had been engaged in highway and airport construction for many years.

▼

OTTO W. GOERLICH, 57, for the past 8 years Superintendent of Highways for Knox County, Illinois, died July 13 in Galesburg, Ill. Prior to his appointment as highway superintendent, he had been a county engineer for about 9 years.

▼

AUBREY MOSS, 59, Road Superintendent of Benzie County, Michigan, for the past 12 years, died last month of a heart attack while at the county garage in Honor, Mich.

▼

LEROY A. GUNDERSON, 51, Road Engineer, Lapeer County, Michigan, 1929, was killed last month in an automobile accident.

ALBERT LALONDE, 53, head of the Albert Lalonde Co., Sidney, Mont., died recently in that city. His company built many miles of highways in eastern Montana, North Dakota and South Dakota.

▼

JAMES D. WHITE, 85, died July 22, in Cleveland, O. He was an engineer on the construction of the Great Northern Ry.'s first main line through the Dakotas and Montana. He later worked on several major engineering projects in Ohio.

▼

W. FRANK THOMAS, 65, member Maryland State Roads Commission, died July 15 in Baltimore, Md. He became a contractor in 1910 and built many roads throughout the state. He retired from the contracting business about 10 years ago.

▼

ALFRED F. JARVIS, 58, head of the Jarvis Construction Co., Sioux Falls, S. Dak., grading contractors, died recently at Dallas, Tex. His firm was one of those engaged in the construction of the Alaskan Highway.

With the Manufacturers and Distributors

Personnel Changes at Union Metal

W. H. Robertson

Walter H. Robertson has joined The Union Metal Manufacturing Co., Canton, O., as manager of piling sales and engineering. Prior to joining Union Metal, he was associated with Massey Concrete Products Co. as vice president in charge of sales and engineering developments. Cove W. Sullivan, formerly manager of piling sales and engineering, is now manager of the New York District, handling the sale of all the company's regular products. R. A. Weinland has been named Lake States district manager. For the duration of the war he will also continue his work as subcontractor supervisor. Robert M. Frost, before joining Union Metal was head of contract unit for the U. S. Maritime Commission. At

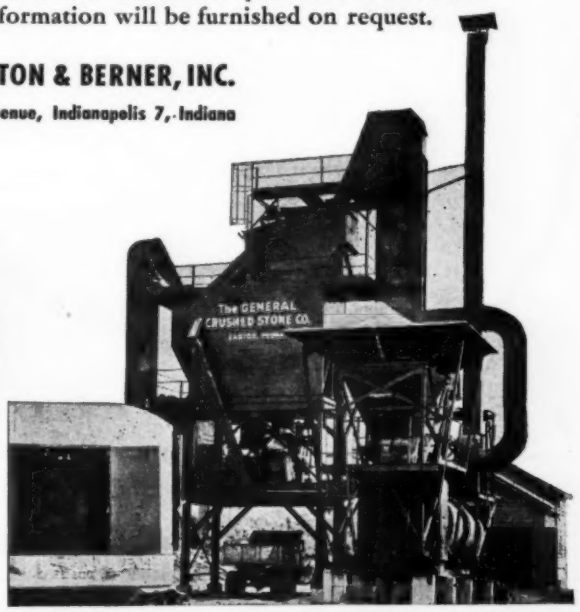
80 to 100 tons
OF HOT MIX PER HOUR
with this H&B All-Electric Portable Asphalt Plant

This Hetherington & Berner portable asphalt plant, recently erected for the General Crushed Stone Company in Delaware, is regularly producing from 80 to 100 tons of hot mix per hour. This is a sectional type, all-electric plant, with electrical equipment completely installed. All units are driven by individual motors and wired completely at our plant. Once the plant is assembled, you are ready to hook up to the power line and start operating. The plant is quickly assembled and disassembled, and easily portable. Refinements in design which contribute to greater compactness and increased efficiency include a larger fan and a new horizontal cyclone dust collector. Complete information will be furnished on request.

HETHERINGTON & BERNER, INC.
721 Kentucky Avenue, Indianapolis 7, Indiana

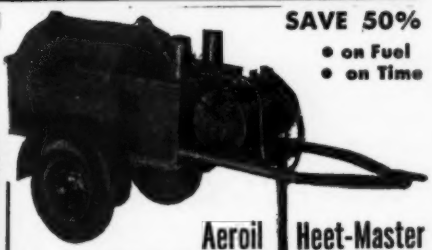
H&B ESTABLISHED 1867

Manufacturers of Portable and Stationary Asphalt Plants of all Types and Capacities.



FOR BEST RESULTS — BATCH MIX • HOT MIX

LA CROSSE
Heavy Duty Machinery Trailers
Built by
LA CROSSE TRAILER & EQUIPMENT CO.
LA CROSSE WISCONSIN



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Aeroil Heet-Master
HEATS AND MELTS ASPHALT
TWICE AS FAST
The ONLY insulated tube fired kettle with a completely removable heating unit (for quick and easy cleaning). The ONLY kettle with the burner INSIDE. Now available on pneumatics (and with mud guards too at slight extra cost. Send for FREE Bulletin No. 200HR. For paving tools and accessories write for Leaflet No. 501RS.
AEROIL PRODUCTS COMPANY
WEST NEW YORK, N. J.
Chicago San Francisco Dallas

BUFFALO-SPRINGFIELD

The Buffalo-Springfield Roller Co.

Springfield, Ohio

The Oldest and Largest Builders of Road Rolling Equipment in America

present he is assisting on expediting and priority matters. Joseph A. Coblentz, formerly with McLean Contracting Co., Baltimore, Md., has been appointed sales engineer with headquarters in the Baltimore Office.

▼

Marion Holds Sales Meeting

The Marion Steam Shovel Co., Marion, O., held its annual sales meeting July 12-14. They brought together all the district managers and factory representatives for a discussion of postwar developments and for the projection of wide range plans. Management policies were discussed, new engineering developments were analyzed in the light of future requirements, advertising plans were established on a broad scale, and market potentials were discussed. The district managers and representatives were given an opportunity to discuss their particular marketing problems and to provide the management with an overall picture of what is anticipated for each district in the period ahead.

▼

De Witt Page New General Manager for Wood Mfg. Co.

De Witt Page has been appointed general manager of the Wood Manufacturing Co., Los Angeles, Calif., manufacturer of Wood Roadmixer. With the exception of one year, Mr. Page has been with Wood Manufacturing Co. continuously since 1937. In his new position he will not only supervise design and manufacturing procedures, but will direct Roadmixer sales policies affecting some 33 Wood distributors throughout the United States. Mr. Page's appointment is in line with a postwar manufacturing and sales expansion program already in the plan stage for this company.

▼

Executives Promoted by Cleveland Pneumatic

Four executives of The Cleveland Pneumatic Tool Co., Cleveland, O., have received promotions. Elmer J. Steger, manager of the pneumatic tool and appliances division, has also been appointed manager of the company's Cleveland rock drill division. Mr. Steger is executive vice-president and treasurer of the company's Canadian subsidiary, Cleveland Pneumatic Tool Co. of Canada, Ltd. Charles E. Vanderpool, former assistant manager of the pneumatic tool division has been

Elmer J. Steger

C. E. Vanderpool

Robert Craig

Albert H. Hruby

made sales manager of that division. Albert H. Hruby, recently in charge of contract termination, becomes sales manager of the rock drill division, and Robert Craig has been named manager of export sales. Mr. Steger has been in the pneumatic tool industry for 20 years. Prior to joining the Cleveland firm he was with the Chicago Pneumatic Tool Co. for 14 years. In 1939 he became associated with Cleveland Pneumatic as district manager of its Pittsburgh office. Mr. Vanderpool became a salesman for Cleveland Pneumatic in 1939. Mr. Hruby has been with the company since 1934. Robert Craig was formerly district manager at Salt Lake City, Utah.

Appointed Assistant Purchasing Agent for "Caterpillar"

Appointment of W. J. Bornholdt as an assistant purchasing agent at Caterpillar Tractor Co. has been announced by J. V. Munro, a vice president of the company. Mr. Bornholdt joined "Caterpillar" in 1928 as assistant chemist in the metallurgical department. In 1942 he was transferred to the subsidiary Caterpillar Military Engine Co. at Decatur, Ill., as chief metallurgist, which position he has held until the present time.

▼

Appointed Vice President of Worthington

H. A. Feldbush

Harry A. Feldbush, formerly works manager of the Holyoke, Mass., plant of Worthington Pump and Machinery Corporation, has been named vice president in charge of engineering for the entire corporation. His duties cover engineering activities of all works and domestic subsidiary companies. His headquarters will be at the general offices in Harrison, N. J. Ralph M. Watson, formerly chief engineer of the Centrifugal Engineering Division, has been appointed assistant to Mr. Feldbush.

▼

New Distributor for Lima

Carroll-Edwards & Co., Richmond and McLean Sts., Cincinnati, has been appointed distributor for Lima shovels, cranes and draglines. R. J. "Bob" Carroll and W. H. Edwards, the owners of this new equipment firm, are both widely known in the southwestern Ohio and southeastern Indiana construction industry. Mr. Carroll who is president, has been active in this area in the machinery and construction industry since 1926. W. H. Edwards, vice president, of the concern is a professional civil engineer. He has been engaged in the construction field since 1921.

▼

New Distributors for Osgood-General

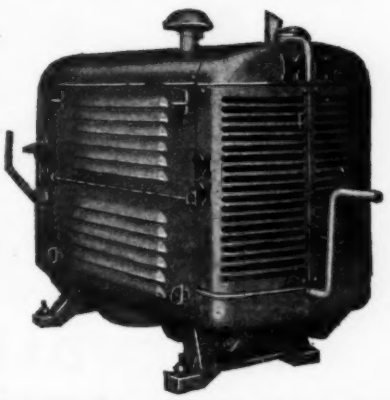
Appointment of six new distributors of Osgood and General Excavator construction, excavating and materials handling equipment has been an-

MM
MINNEAPOLIS MOLINE
TWIN CITY OIL FIELD ENGINES

"BUILT to do the JOB"

Stamina—the ability to "take it" for long periods of real tough going *doesn't* come as an *accessory* to Oil Field Engines. You *can't buy* it as an extra, it's either *designed* and *built into* every part of the engine or it isn't there at all.

MM Oil Field Engines *don't* have to be coddled because they have all the performance features *"built-in"*—Features that guarantee real low cost performance under tough conditions—Features that will give *you* assurance of 24 hour operation year in and year out in fair weather and foul—Features that will give you low cost, efficient, trouble free operation. Force-feed lubrication, valve-in-head design, high turbulence combustion chamber, controlled cooling, unit construction, automatic magneto cutout, automatic temperature cutout, flyball type variable speed governor, entirely enclosed in crankcase, oil wash air cleaner and ample size oil filter—*these features and many others are "built in" on every MM oil field Engine.*



MM Oil Field Engines are built in 8 sizes to fit most every oil field application:

165-4A, 3 5/16x4, 4 cyl.	CUA, 4 1/4x5, 6 cyl.
206-4A, 3 5/16x5, 4 cyl.	HUA, 4 1/2x6, 6 cyl.
KUA, 4 1/4x5, 4 cyl.	MEU, 8x9, 4 cyl.
LUA, 4 5/16x6, 4 cyl.	NEU, 8x9, 6 cyl.

For Complete Information on MM Oil Field Engines, Write
SHRIMPTON EQUIPMENT COMPANY
DISTRIBUTORS
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Los Angeles 13, California
545 Mellie Esperson Building
Houston, Texas
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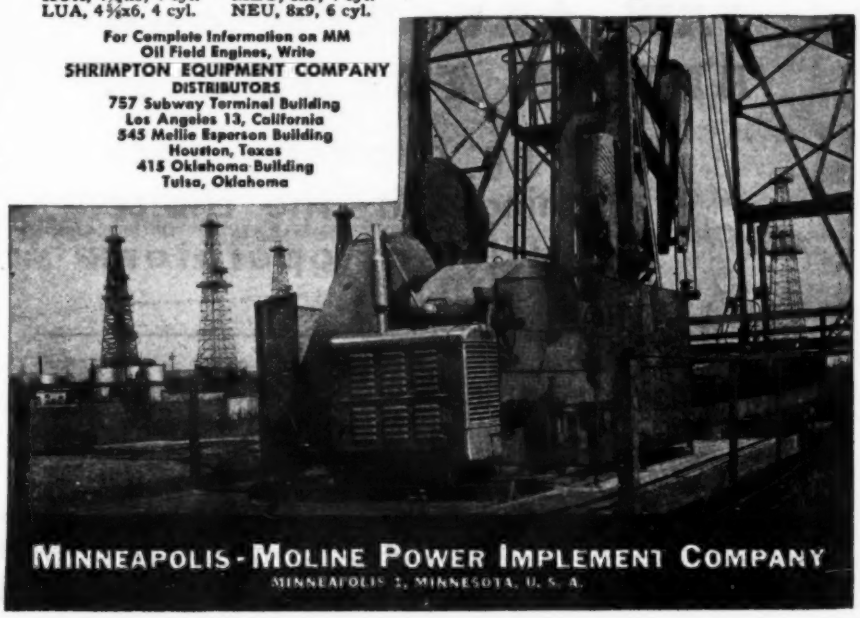
Tulsa, Oklahoma



MINNEAPOLIS-MOLINE POWER IMPLEMENT COMPANY
MINNEAPOLIS 1, MINNESOTA, U. S. A.

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GUTTER-SNIPE
PICK-UP STREET SWEEPERS

STREET FLUSHERS
STREET SPRINKLERS
BITUMINOUS DISTRIBUTORS
BITUMINOUS MAINTENANCE UNITS

Since 1908

MUNICIPAL SUPPLY COMPANY - SOUTH BEND 23, INDIANA

RELIANCE
CRUSHING, SCREENING and WASHING UNITS
● Up to 2000 Tons a Day ●

Crushers	Bins	Drag-Lines
Elevators	Pulverizers	"GAYCO"
Sweepers	Feeders	Centrifugal
Screens	Spreaders	Air Separators
Wash Boxes	Kettles	
	Conveyors	

UNIVERSAL ROAD MACHINERY CO.
Kingston, N. Y.
Canadian Representatives: F. H. Hopkins & Co., Ltd. 340 Canada Cement Co., Montreal, Que., Can.

Your Best Bet...

for Highest Crushing Efficiency

GRUENDLER Portable JAW CRUSHER and APRON FEEDER...

a high capacity rock crushing unit—the choice of efficient operators

Manufacturers of

PRIMARY HAMMERMILLS AND SECONDARY HAMMERMILLS FOR LIMESTONE.

Write for Illustrated Bulletins

GRUENDLER

CRUSHER and PULVERIZER CO. • ST. LOUIS 6, MISSOURI

nounced by M. C. McNeil, president of The Osgood Co. and The General Excavator Co. of Marion, O. In southeast Florida, Allied Equipment has taken over the combined Osgood-General franchise, while Don Graze, Jacksonville, Fla., will handle sales and service in northern Florida. The Texas Railway Equipment Co. will serve the Houston (Texas) area, and the VandeWater Co., of Walden and Schenectady, N. Y., will serve Sullivan, Ulster and Orange counties in that state. Gibson-Stewart, Cleveland, will provide Osgood and General sales and service facilities in Ohio.

New Distributors for Barber-Greene

Barber-Greene Co., Aurora, Ill., appointed Phillippi-Murphy Equipment Co., 360 Hoover St., N.E., Minneapolis 13, Minn., as exclusive distributor as follows:—Representing the Barber-Greene Industrial Division in the northeast portion of Minnesota bounded by and including the counties of Koochiching, Itasca, Crow Wing, Carlton, and Aitkin, and covering products sold to mines, pits and quarries only. This territory will be served by T. T. Murphy and S. J. Phillippi of the Minneapolis office.—Representing the Barber-Greene Construction and Industrial Divisions in the entire state of South Dakota. This territory will be served by the branch office of Phillippi-Murphy Equipment Co., located at 908 N. Main Ave., Sioux Falls, S. D., where Joseph E. Hexamer is general manager.

▼

New Sales Manager for 3-M Co.

The promotion of Robert R. Miller to sales manager, industrial trades, and W. J. Streicher to sales manager, distributor trades, in the Cincinnati territory, has been announced by George H. Halpin, Minnesota Mining & Manufacturing Co. vice president and general sales manager. Mr. Streicher, a salesman in the Indiana territory at the time of his promotion,

R. R. Miller

W. J. Streicher

has been with 3-M Company for 17 years. He will assume responsibility for all salesmen handling abrasives and related items in that part of the Cincinnati division included in the states of West Virginia, Kentucky, Tennessee, Alabama and Georgia. Mr. Miller a 3-M employee for 21 years and recently a salesman in Ohio, will remain in that territory in his new supervisory capacity.

▼

New Buffalo-Springfield Distributors

Having discontinued their Philadelphia office, The Buffalo-Springfield Roller Co. of Springfield, O., is now represented in Philadelphia by the Service Supply Corporation, 2020 Erie Ave., Philadelphia. Selling the complete line of Buffalo-Springfield road and street rollers, the Service Supply Corporation also maintains complete facilities for servicing rollers.

The Clyde Everett Equipment Co., 296 Binney St., Cambridge, Mass., has been appointed distributor in the New England States for The Buffalo-Springfield Roller Co. In addition to sales, the Clyde Everett Equipment Co. maintains complete service facilities.

Bitucote Opens Branch Plant at Camden

The Bitucote Products Co., St. Louis, Mo., has opened a branch plant at 16 Old White Horse Pike, Camden, N. J. The company, whose main plant and general offices are in St. Louis, also maintains manufacturing plants in El Dorado, Ark., and Cincinnati, O. The following new eastern representatives have been appointed: Edward J. Blanchfield, 50 Mt. Vernon St., Cambridge 40, Mass., manufacturers agent in New England; the Collins Oil and Manufacturing Co., 90 West St., New York City, sales representatives for the Greater New York area.

▼

H. H. Buchanan Appointed Director of Foreign Operations

H. H. Buchanan

Lima Locomotive Works, Incorporated, Shovel and Crane Division, Lima, O., and the Michigan Power Shovel Co., Benton Harbor, Mich., have jointly announced the appointment of High H. Buchanan as Director of foreign operations for both concerns. Mr. Buchanan began his sales career 22 years ago. Since that time he has held responsible positions with many leading manufacturers of earthmoving, excavation, material and steel erection equipment. Until recently, Mr. Buchanan was vice president and general sales manager of the LaPlante-Choate Manufacturing Co., Cedar Rapids, Ia. This arrangement provides a complete line of shovels, cranes and draglines both crawler and truck mounted, in sizes ranging from ⅜ to 5 yd. for world markets.

▼

C. J. Foster Retires from Active Duty

C. J. Foster, executive officer of The Buffalo-Springfield Roller Co., Springfield, O., is retiring from active service, effective Dec. 31, 1945. A stockholder in the company, Mr. Foster will continue as a director in an advisory capacity. He joined the O. S. Kelly Co. in 1898 when that concern built steam road rollers. When O. S. Kelly sold that portion of its business to the Kelly-Springfield Road Roller Co., he went with the latter concern, which is now known as The Buffalo-Springfield Roller Co.

Available Now

Here's good news. Now that the war is confined to one front and armed services requirements have slacked off a little, a limited number of Insley Excavators are available to civilian buyers upon authorization of WPB. The first Insley released to a civilian contractor since 1942 already has been delivered and more will follow.

For lower cost yardage on your job, see your Insley dealer today about the availability of a new ⅜ or ½-yd. Insley Excavator. Designed for use with five readily interchangeable attachments . . . shovel, crane, hoe, clamshell and dragline . . . crawler, rubber or rail mounted . . . gasoline, diesel or electric powered.

INSLEY MANUFACTURING CORP., INDIANAPOLIS 6, IND.

New Dealer for Davey

Davey Compressor Co., Kent, O., has announced appointment of Andruss Equipment Service Co., 1264 Blackstone Ave., Fresno 3, Calif., as dealer for the Davey line of portable and stationary compressors, heavy-duty truck power take-offs and pneumatic saws in the central California territory embracing the counties of Fresno, Merced, Madera, Mariposa, Kings and Tulare. Andruss Equipment Service Co. was founded early this year by Cliff G. Andruss.

T. R. Clark Returns to Caterpillar

Major Thomas R. Clark, who resigned his position with Caterpillar Tractor Co. in July 1942 to enter the Corps of Engineers as a tractor specialist, has received his honorable discharge from the Army and has rejoined the "Caterpillar" organization. He joined the Sales Department of "Caterpillar" in 1929 and served as district representative at Denver and later at Minneapolis. He returns to become district representative, with headquarters at Omaha, Neb.

Where DUST CONDITIONS ARE SEVERE...

A COLLECTOR PRE-CLEANER HERE...

CUTS SERVICING TIME HERE!

The Donaldson Collector Pre-Cleaner removes from 50 to 75% of the air-borne dust that would otherwise pass into the oil-washed cleaner. It thus prolongs the period between servicing of the oil cup . . . saving time and oil too! It also serves as a rain shield and a barrier to twigs and chaff.

The Collector Pre-Cleaner can be easily fitted to construction, excavating, road building, and road maintaining machinery now equipped with Donaldson Oil-Washed Air Cleaners. See your dealer or write for prices and information.

Write

Dealer and Distributor Inquiries Invited

AIR STACK CAPS

Where a Collector Pre-Cleaner is not essential, an air stack cap should be fitted to keep out rain and large foreign particles.

DONALDSON *Oil Washed* AIR CLEANERS

Donaldson Co. Inc., 666 Pelham Blvd., St. Paul 4, Minn.

Link-Belt Announces Promotions

Edward J. Burnell, vice-president, Link-Belt Co., Chicago, has announced the appointment of A. C. Fellinger to the position of sales manager, power transmission machinery, with headquarters at the company's Ewart plant in Indianapolis. This change is made to fill the vacancy caused by the untimely death of C. Walter Spalding. Mr. Fellinger joined the Link-Belt organization at Indianapolis in 1916. His last position was manager of sales through distributors, with headquarters in Chicago. The sale and application of Link-Belt silent chain drives

H. F. Weber

A. C. Fellinger

will hereafter be headed up by H. F. R. Weber, divisional sales manager, silent chain drives, with headquarters at the Ewart plant in Indianapolis. G. H. Woody continues as sales manager of the ball and roller bearing division, with headquarters at the company's ball and roller bearing plant in Indianapolis. Sales through Link-Belt distributors will be supervised by F. A. Hurd, divisional sales manager, industrial distributor sales, Chicago; G. H. Unruh, divisional sales manager, industrial distributor sales, Philadelphia; and Harry Reisser, divisional sales manager, automotive equipment sales, Indianapolis.

▼

New Barber-Greene Area Sales Managers

Barber-Greene Co., Aurora, Ill., has expanded its area sales organization by appointment of area sales managers for the New York and Canadian sales areas. Capt. Earle F. Lamprey, until recently stationed at Camp Claiborne, La., Maintenance Division Headquarters, where he supervised construction and maintenance work, is placed in charge of the New York area. Until headquarters can be established in New York City, he is serving the territory from the Barber-Greene Boston office, located at 84 Rogers St., Cambridge 42, Mass. For many years, prior to serving in the armed services, Lamprey was with the Barber-Greene Boston Sales office. Ralph Dano, recently released by the War Production Board, where

S. E. McCrum New Assistant Advertising Manager Wickwire Spencer

C. B. Konselman, advertising and public relations manager, Wickwire Spencer Steel Co., has announced the appointment of Sidney E. McCrum as assistant advertising manager. Mr. McCrum was previously assistant to the advertising manager of the Chicago Pneumatic Tool Co., New York. He has had extensive experience in advertising preparation and production.

New Distributor for Barber-Greene

Barber-Greene Co., Aurora, Ill., has appointed Miller Equipment Co., 558 Bond Ave., N.W., Grand Rapids 2, Mich., as exclusive distributor in the construction field. Territory served by Miller Equipment Co. consists of the lower peninsula of Michigan west of and including the counties of Emmet, Charlevoix, Antrim, Kalkaska, Missaukee, Clare, Isabella, Montcalm, Ionia, Eaton, Calhoun and Branch, but excluding Berrien County.

he was on leave from Barber-Greene as deputy director, Construction Machinery Division, now heads Barber-Greene sales activities in Canada. He will make his headquarters in Toronto, and temporarily may be reached c/o Mussens Canada Ltd., 111 Merton St., Toronto, Ont., Canada. Before going with WPB, Dano was a Barber-Greene sales engineer, and has been with the company since 1923. Other Barber-Greene area sales managers are L. A. Larson, Minneapolis; B. E. Lindstrom, Aurora, Ill.; E. L. Benson, San Francisco; E. H. Cooper, Dallas; and Tom Benbow, Atlanta.

▼

Don Poor Appointed Advisory Manager of Ceco

Don Poor

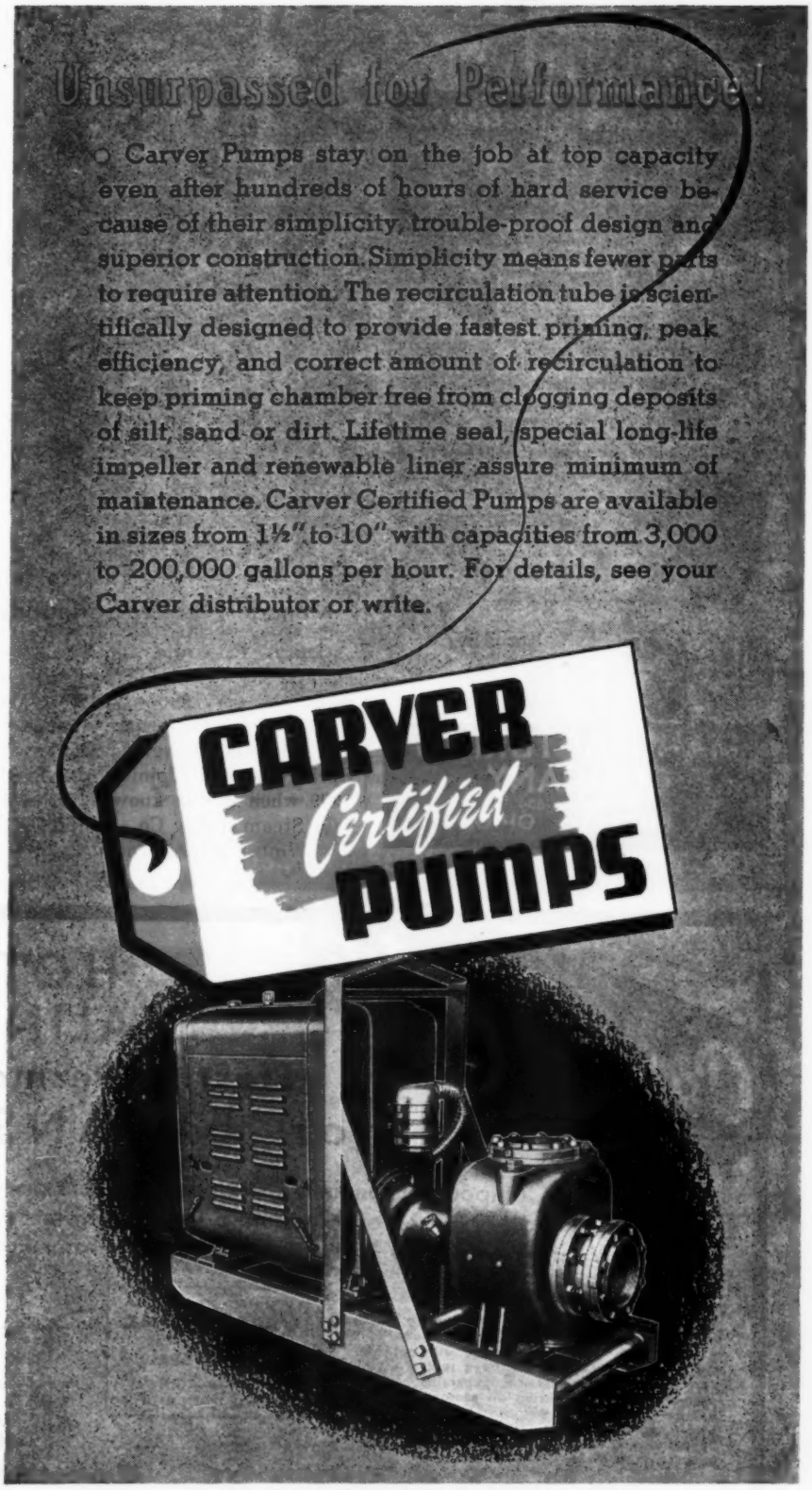
Don Poor has been appointed advertising manager of Ceco Steel Products Corporation with headquarters at 5701 W. 26th St., Chicago, Ill.

For five years prior to his new appointment, Mr. Poor was assistant advertising and sales promotion manager of Lyon Metal Products, Inc., of Aurora and Chicago Heights, Ill. Previously, as well as free-lancing in advertising and graphic arts fields, he was manager of Stewart Howe Alumni Service in Evanston, Ill., and Bloomington, Ind., publicity director of the Tax Warrant division of the Chicago Schools committee, and managing editor of the South Shore Country Club magazine, Chicago. Part of his new assignment will be to control an institutional campaign embracing wide product diversification.

▼

John Gronlund Joins Pettibone Mulliken

John Gronlund has recently joined the organization of Pettibone Mulliken Corporation, Chicago, Ill., as director of sales in their construction equipment division. Mr. Gronlund's many years of experience in the construction equipment field includes former connections with the LaPlant-Choate Co., and the Buckeye-Traction Ditcher Co. The products that will receive special attention under the direction of Mr. Gronlund are the PMCO line of shovel dippers, pullshovel dippers, drag line and clamshell buckets, which are now in full volume production.


Unsurpassed for Performance!
Carver Pumps stay on the job at top capacity even after hundreds of hours of hard service because of their simplicity, trouble-proof design and superior construction. Simplicity means fewer parts to require attention. The recirculation tube is scientifically designed to provide fastest priming, peak efficiency, and correct amount of recirculation to keep priming chamber free from clogging deposits of silt, sand or dirt. Lifetime seal, special long-life impeller and renewable liner assure minimum of maintenance. Carver Certified Pumps are available in sizes from 1½" to 10" with capacities from 3,000 to 200,000 gallons per hour. For details, see your Carver distributor or write.
CARVER
Certified
PUMPS

THE CARVER PUMP CO.
Muscatine, Iowa

CARVER CENTRIFUGAL
Certified PUMPS

Shunk

Superior Quality

BLADES AND CUTTING EDGES

For any make of machine
Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls. Also—

CUTTING EDGES
WEARING SHOES
BACK SLOPERS
EXTENSION BLADES
MOLDBOARDS
and
SCARIFIER TEETH

30 years of manufacturing blades has developed for you a special steel, milled through our own rolls and forged at the edges to give that extra wearing quality you need.

All widths lengths, and thicknesses. Punched ready to fit your machine.

Consult your internationally recognized Blade Specialists. Write for special bulletins, giving type and name of machines you operate—get set for Blades early.

Shunk

MANUFACTURING COMPANY

Established 1854

BUCYRUS OHIO

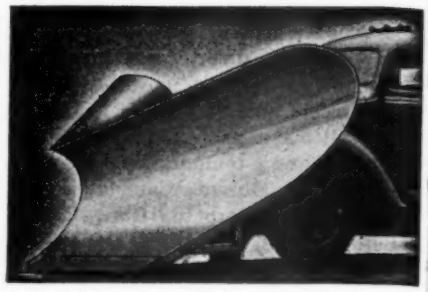
Jack Rheay Joins Osgood-General

R. S. (Jack) Rheay, prominent highway and construction engineer, has been named by The Osgood Co. and The General Excavator Co., affiliated power shovel and crane manufacturers of Marion, O., as division sales manager for southeastern United States. Mr. Rheay formerly handled southeastern sales for the Wheeling Corrugated Co. of Wheeling, W. Va. Previous to that, he served as equipment engineer for the Alabama State Highway Department. Although plans are not completed, it is expected that he will make his headquarters in Atlanta.

▼

G. P. White, New Eastern Sales Manager, Buffalo-Springfield

George P. White, for many years actively engaged in all types of roller sales and service, has recently been appointed eastern sales manager of The Buffalo-Springfield Roller Co., Springfield, O. Joining the firm in 1909 when it was known as the Buffalo Steam Roller Co., Buffalo, N. Y., Mr. White has done most of his work



ROOT INTERCHANGEABLE SNOW PLOWS

Highway Commissioners, Road Engineers and Supervisors of road maintenance prefer Root Interchangeable Snow Plows for opening up streets, highways and airport runways, removing barriers of snow and ice. Get the facts, investigate maintenance costs ...you'll understand the reason why Root plow units "get the nod" when purchasing decision is made by those charged with snow removal in the road, street and airport field.

Write for Bulletin

ROOT SPRING SCRAPER CO.

Kalamazoo 11, Mich.

Builders of road maintenance equipment since 1890

Servicised Para-Plastic

HOT POURED SEALING COMPOUND

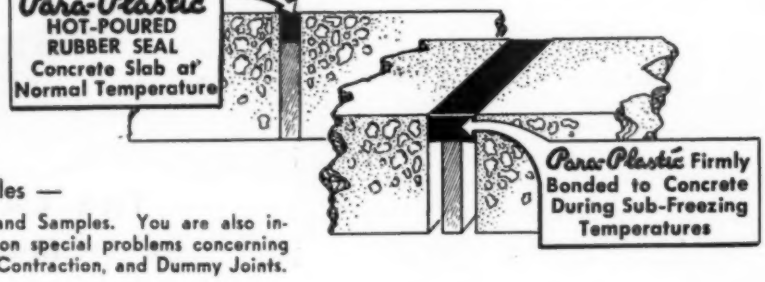
Elastic! Permanent! Waterproof!

for EXPANSION JOINTS

☆ A Resilient Compound Especially Developed by Servicised for Expansion Joints in Concrete Roadways and other types of Monolithic Construction. Para-Plastic Maintains Bond during Subzero Weather and Will Not Extrude in Summer nor Freeze or Crack in Winter.

Costly Maintenance Eliminated

A concrete Highway or Air Port Runway which has been protected by sealing the expansion and contraction joints with Para Plastic will out-live any similar pavement which has been sealed with ordinary asphalt. Para Plastic Expansion Joints are permanently sealed during all seasons of the year, whereas asphalt seal will ordinarily crack open in winter and allow spring rains easy access to the joint. Expensive maintenance of Expansion Joints is eliminated by use of Para Plastic.



— Send for Samples —

Send for Catalogue — Ask for Information and Samples. You are also invited to consult our Engineering Department on special problems concerning our method of permanently sealing Expansion, Contraction, and Dummy Joints.

SERVICISED PRODUCTS CORP.

6051 West 65th Street, Chicago, 38, Ill.

in New York and the eastern states, testing, demonstrating, and acting as a travelling roller expert. Transferred to the Philadelphia office in 1912 as service manager, he became Philadelphia Branch Manager in 1915. He retained that position until his present appointment as eastern sales manager of the company.

▼

New Works Manager for Marion

A. W. Hedberg

M. E. Montrose, president and general manager of The Marion Steam Shovel Co., has announced the appointment of Axel W. Hedberg as works manager, effective July 1. Mr. Hedberg has had experience in supervisory and plant management duties after an earlier apprenticeship in machine work followed by additional diversified experience in tool, plant, and industrial engineering. He was associated with General Motors Research, Republic Steel Co., Briggs Manufacturing Co., and recently resigned as St. Clair Division Branch Manager of Parker Appliance Co. in Cleveland, O.

▼

To Handle Tyson Export Sales

H. J. Vines, Director of Sales for Tyson Bearing Corporation, Massillon, O., manufacturers of tapered roller bearings, has announced the appointment of Borg-Warner International Corporation, Chicago, as their sales representatives in all export markets with the exception of Canada and Alaska.

▼

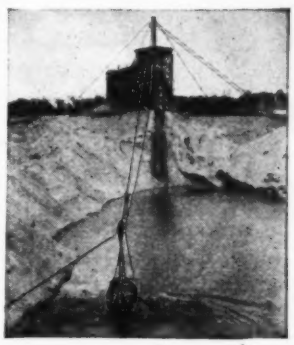
C. H. Richardson Resigns from Allied Steel

C. H. Richardson, who has been directing sales, advertising, promotion and exporting for the Allied Steel Products, Inc., and the Pittsburgh-Cambria Steel Co. of Cleveland, O., has resigned these connections and will devote the summer months to promoting an auto ferry and passenger steamship service across Lake Erie between Sandusky, O., and Canada. The steamship service is an account of the Oleida Advertising Agency of Sandusky, O., which is owned by Mr. Richardson.

SAUERMAN

Long Range Machines

Slackline Cableways Excel on Difficult Digging



Above picture shows how a Sauerman Slackline Cableway digs deep under water and lifts gravel to a hopper on top of a screening plant. The operating cost is only a few cents per cubic yard handled and the machine cleans up every yard of material within a 700-foot radius of the plant. This machine was installed in 1919—has handled several million cubic yards at three locations—is still as good as new.

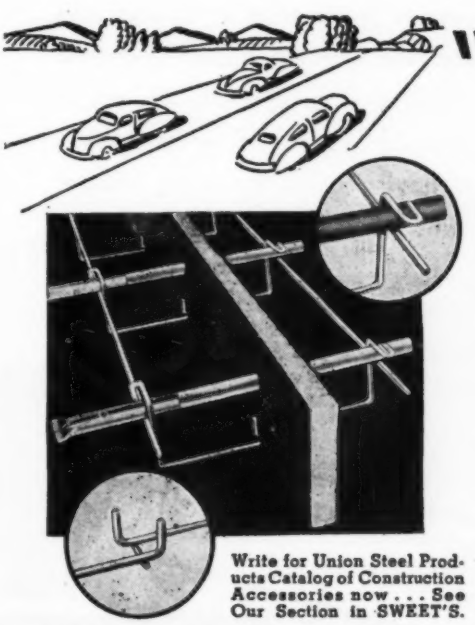
WHEN you have a problem of moving almost any kind of material, from a deep pit, river or pond, to a hopper, storage pile or other elevated point—there's nothing quite equal to a Sauerman Slackline Cableway.

This machine is digger, conveyor and elevator all in one. It utilizes a round bottom excavator bucket that has the same powerful digging action as the buckets used on revolving dragline excavators. The bucket is chain-suspended from a carrier running on an inclined truck cable and is equipped with a simple dumping device which permits automatic dumping at any pre-determined point along the track cable.

After dumping its load, the empty bucket is carried by gravity back to the digging point. The track cable swings around a central mast or tower in a wide arc, the radius of which may be as much as 1200 ft., and the bucket digs and delivers wherever the operator wishes within the radius. Bucket sizes range from 1/3 to 3½ cu. yd. Electric, gasoline or Diesel power. One-man automatic control. Ask for Catalog 19-C.

SAUERMAN BROS., Inc., 588 S. Clinton St., CHICAGO 7

True To Name . . .



"QWIK-LOCK"

Expansion Joint Assemblies

For easy installation and foolproof functioning, "QWIK-LOCK" Expansion Joint Assemblies can't be beat. They are designed to make it easy to position and lock dowels, absolutely parallel to each other and to the subgrade. Thus they speed up road building and assure better joints at lower cost.

Write for Union Steel Products Catalog of Construction Accessories now . . . See Our Section in SWEET'S.

UNION STEEL PRODUCTS COMPANY
419 N. Berrien, ALBION, Michigan

CONCRETE & BUILDING SPECIALTIES, LTD.
3334 Danforth Avenue, Toronto, Canada

WILLIAMS WALLACE COMPANY
100 Hooper Street, San Francisco, Calif.

Pat. No. 2,280,275—April 21, 1942

Make your snow plowing

SAFE!

"BE safe rather than sorry." Equip each plow with KEYSTONE SNOW PLOW LIGHTS. Ahead and to the rear they flash a big warning in red, blue or amber, STOP. (Letters are 2½ inches high) that instantly attracts attention and can be seen through the swirling snow. These 80 times-per-minute flashes warn in time to avoid accidents. They protect the public—your men—your equipment. They're used by many states, cities, counties, towns, parks and bridges.

IMMEDIATE DELIVERY CAN BE MADE

KEYSTONE LIGHTS FLASH TO FRONT & REAR

AUTO GEAR & PARTS CO.

1410 WEST HUNTING PARK AVENUE, PHILADELPHIA, PA.

H. P. Mee Dies

Herbert P. Mee, a former vice president of Caterpillar Tractor Co., died July 3 at his home in Santa Barbara, Calif., after an illness of several months. Mr. Mee joined the C. L. Best Tractor Co. in 1920 as credit manager and when the Best company and The Holt Manufacturing Co. merged in 1925 to form Caterpillar Tractor Co. he became treasurer of the organization. He was named secretary-treasurer in 1926, a year later becoming vice president and treasurer. In 1934 he was made vice president of sales, later taking over the additional administration of advertising and service. He resigned his position with "Caterpillar" in 1937, going to the west coast where he operated citrus ranches in the Santa Barbara vicinity.

McIlvaine Joins A.P.W.A.

W. D. McIlvaine, Jr.

The American Public Works Association, with headquarters at 1313 East 60th St., Chicago, Ill., has added William D. McIlvaine, Jr. to its staff as assistant director. Mr. McIlvaine is a graduate of the University of Minnesota, also having earned his Master's Degree at that institution. He had been employed by the University of Minnesota, the Minnesota State Highway Department, and since 1933 by the Minneapolis-St. Paul Sanitary District, his last position there being assistant engineer and acting mechanical engineer in charge of engineering and maintenance. Mr. McIlvaine will devote his efforts to the stimulation of sound public works programs and practices, in line with the purposes of the association.

Manufacturers' Literature

Material Spreaders—A 4-page circular issued by Highway Equipment Co., Inc., 720 1st Ave., W., Cedar Rapids, Ia., illustrates and describes four models of its line of spreaders. Specifications also are given. An important feature of one of these models is that it spreads cinders or other material ahead of the rear wheels, thus affording better traction on icy pavements.

Excavating Equipment and the War

The second in a series of booklets which report on Bucyrus-Erie equipment in the war has just been published by Bucyrus-Erie Company, South Milwaukee, Wis. "IN WAR AND PEACE PROGRESS STARTS WITH EXCAVATION" contains dramatic photographs of ⅜ to 2½-yard shovels, draglines and cranes. The 36-page booklet, available at local Bucyrus-Erie distributors or at the Bucyrus-Erie Company, South Milwaukee, Wis., describes the basic part excavating has played in the past in building the modern standard of living all over the world—how the dirt-moving industry prepared the ground work for defense in America, aided in the construction of advanced bases, and worked on the fighting fronts, how postwar progress must start with excavating.

▼

Service Tools for Caterpillar Tractors—A useful 20 page bulletin has been issued by Owatonna Tool Co., illustrating and describing typical applications of its service tools on tractors. The OTC pulling system, of which the tools are a part, is made up of 11 basic pulling tools, seven sizes of grip-o-matic pullers and four sizes of push pullers, together with a variety of attachments and adapters which adapt the basic pullers to practically every pulling or pushing job found in service operations regardless of the make or model of equipment being serviced. Copies of Bulletin No. C.T. 25 can be obtained from Owatonna Tool Co., 319 Cedar St., Owatonna, Minn.

▼

Tournatrailer—A 4-page folder has been issued by R. G. LeTourneau, Inc., Peoria, Ill., illustrating and describing the use of its Tournatrailer in hauling from shovel in dragline.

▼

Excavations, Cranes, Trailers—Catalogs and circulars illustrating and describing its line of excavations, cranes and trailers have been issued by the Hanson Clutch & Machinery Co., Tiffin, O. The excavators and cranes include ⅜ cu. yd. ½ cu. yd. and ¾ cu. yd. shovels and 4 to 15 ton cranes. Working ranges and specifications are given as well as details of principal construction features. The catalogs on trailers cover the 10 ton, 15 ton, 20 ton, 30 ton and 40 ton goose-neck types. Specifications as well as the principal construction features of these trailers are included.

SPEED with Richkraft "Model A" Spray Machine

—With a Richkraft "Model A" Curing Spray Machine — the spray machine the Road Industry has been waiting for. Here is the answer to the demand from engineers and contractors for a *real* spray machine. Practical design—quality built—engineered for the job by men who understand the problem—not to be compared with "home made rigs" so often used for curing compounds.

The best materials give inferior results when applied with inferior equipment. They gum up in the machine, spread unevenly, waste time and money. There is none of this with a Richkraft "Model A."

Equipped with eleven spray nozzles of the newest, most efficient design, mounted on a 60" spray bar, the unit moves smoothly across the concrete, covering a five foot swath with each pass.

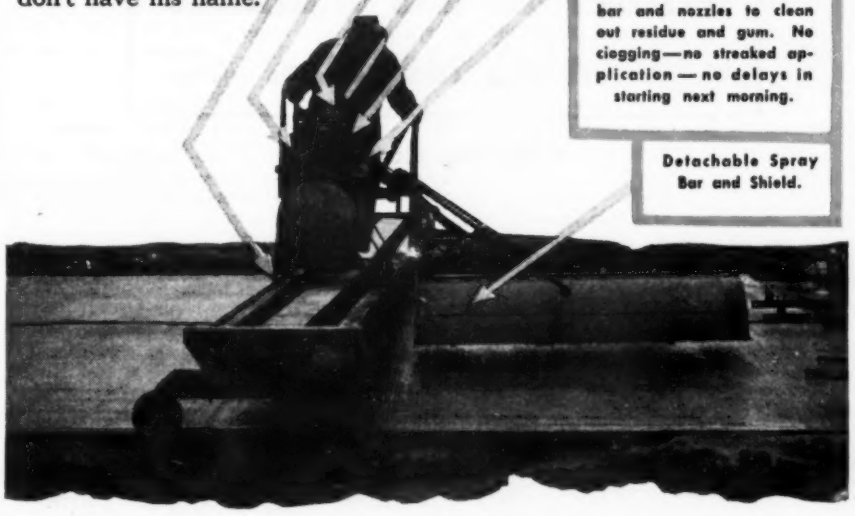
A closed windshield over the spray bar prevents loss of material because of wind — no suction, no air currents can distort the smooth spreading of an accurate film of compound.

Missed spots, flareouts, intersections are easily cared for by a hand spray with nozzle and 15 ft. of hose.

Look over the features at the right! Orders placed now will be handled at today's price for delivery before April 1, 1945.

We have a full line of machines from hand-operated units to the "Model A." Ask your Richkraft dealer about them. Write us if you don't have his name.

- Four roller bearing wheels, complete with 60 ft. of pre-punched track for your bridge.
- Hand spray with 15 feet of hose for missed spots.
- 1½ H.P. Air Cooled Engine.
- Quincy Air Compressor and 30 gal. tank.
- Control valve on bridge with pressure gauge, material strainer, relief valve and all necessary connections.
- MOST IMPORTANT OF ALL Two gallon "clean out tank" for naphtha. At the end of the day this solvent is blown through the spray bar and nozzles to clean out residue and gum. No clogging—no streaked application — no delays in starting next morning.
- Detachable Spray Bar and Shield.



THE RICHKRAFT COMPANY

Builders Bldg., Chicago 1, Ill.
7 W. State St., Westport, Conn.

A Richkraft BUILDING PRODUCT

Round and Round They Go.

All Over the World!

EWC WHEELS

We've been making good wheels for more than half a century—and had begun to get a little complacent about it—until people began telling us what a job EWC Wheels were doing all over the world. Our accumulated experience, and modern engineering combine to produce outstandingly fine wheels to meet every need. Now, with the most modern equipment to produce disc wheels, we are in a doubly fine position to work with you.

Write for special information about EWC Wheels.

EWC WHEELS

Electric Wheel Co., Dept. RS Quincy, Ill.

TRANSITS and LEVELS

New or Rebuilt
Sale or Rent

Headquarters for REPAIRS—any make. Factory Service. We will also *buy* your old instruments or take them in *trade*.

A complete line of Engineering Instruments and Equipment for Field or Office. Write for Bulletin RS-17.

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Manufacturers of Sterling Transits and Levels
136 N. 12th St. Philadelphia 7, Penna.

FOR SALE

1—Barber-Greene Asphalt Spreader	$3750.00
1—Foote Paver	4000.00
1—Huber Roller—Gas, 10 ton (three wheel)	1750.00
3—Steam Tandem Roller	(Prices vary)
1—Barber Asphalt Plant—2000# box	15000.00
1—Acme stone crusher, screns and elevator equipped with McCormick Deering power unit	1200.00

Phil H. McGuire
P.O. Box 34, 35th Street Station, Norfolk 8, Va.

WANTED: A Graduated Chemist experienced in general highway chemical laboratory work, especially analyses of cement, paint and bituminous materials. Write H. C. Weathers, State Road Department, Gainesville, Florida.

Concrete
VIBRATORS and GRINDERS
Write for Circular on types, sizes and Prices
ELKHART **White Mfg. Co.** INDIANA

ASPHALT TANKS

• 19—6,000 gal., 8,000 gal., and 10,000 gal. capacity heavy R.R. car tanks with heating coils.

Immediate shipment from Illinois—Louisiana—New Jersey

L. M. Stanhope Wayne, Pa.

TIRE REPAIRS

All sizes truck, tractor and 1400x24 tires. Our Equa-Flex repair is built for heavy and rough work.

It is guaranteed for six months, if the repair fails your money will be refunded.

WALLACE TIRE SERVICE, Inc.
2339 S. Michigan Ave. Chicago 16, Ill.

Clearing House

FOR SALE

Heavy Excavation outfit consisting of Dragline, Bulldozer, Motor Grader & five 10-yard hauling units. For information write Box 1800, Roads and Streets, 330 So. Wells Street, Chicago 6, Ill.

FOR SALE

FWD Truck, 1941, excellent, run 24,000 miles; Garwood Dump Body, 150 H.P. Cummins Diesel engine; all controls for snow plow, with or without snow plow. Bargain.

Brooks Load Lugger, late model CH-200, including 2 cu. yd. buckets; $600.00.

Iowa Portable Crushing Plant, late model R.B. 18" x 24", Caterpillar Diesel engine, folding elevator, screen. $5000.00.

Good Roads Portable Crushing Plant, late model R.B. 12" x 20", 60 H.P. LeRoi Gasoline engine, folding elevator. $2500.00.

Tellsmith-Wheeler 15" x 38", R.B. Rebuilt. $3200.00.

Pioneer, R.B., 9" x 16", v-belt, A.C. engine. Portable. $900.00.

LeRoi 315 cu. ft.-2-stage Portable Compressor. Overhauled. $1750.00.

Ingersoll-Rand X-71 Wagon drill, rebuilt, late model. $750.00.

Parsons Ditcher. #21. Good order. $1750.00.

P. & H. #206, 40-ft. boom, ¾ yd. Dragline bucket. $2800.00.

M. Wenzel, 2136 Jefferson, Kansas City, Mo.

SALES MANAGER

40-45, mechanical merchandising background. Established distributing company in competitive mechanical field, requires man having experience in supervision and sales promotion, selling construction equipment; supplies engines and power units. Prefer man having practical knowledge of internal combustion engines. Salary and bonus, location eastern Pennsylvania. State specifically age, earnings, last five pre-war years, type of industries followed.

Box 1802, Roads & Streets, 330 So. Wells Street, Chicago 6, Ill.

For Sale

One (1) Littleford 4200 gallon insulated distributor with Twenty-four (24) Foot bars. Can also be used as transport truck. Built in 1942.

With or without White Model 720 tractor.

GULF ASPHALT CORPORATION
900 MARITIME BLDG.
NEW ORLEANS (12), LA.
Telephones: MAgnolia 1981
CAnal 5912

FOR SALE

1—160 h.p. Diesel Engine
1—110 cu. ft. Air Compressor
1—160 cu. ft. Air Compressor
Compressors mounted on trailers
1—Thew Steam Shovel and Crane with 1¼ yard rock bucket.

Stiers Bros. Construction Co.
2944 Magazine St. St. Louis 6, Mo.

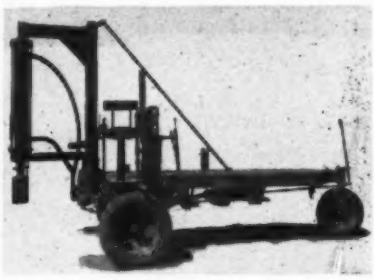
FOR SALE

UNIVERSAL TOOLS!! — Pipe Wrench, Channellock Pliers, Adjustable Wrench, CENTER Pliers, Diagonal Cutters, Hammer, Screwdriver, Vise-Grips, Hack-Saw, Cold Chisel — **$19.85 16 Pc. SET**

Mail Orders Shipped Promptly. Remit with Order. Catalogue Free with first order. Remember: We have it—can get it—or it isn't made!! Mail your order today.

DEALERS TOOL SUPPLY
1527 Grand Ave. N. S. Kansas City, Mo.

RAPID!



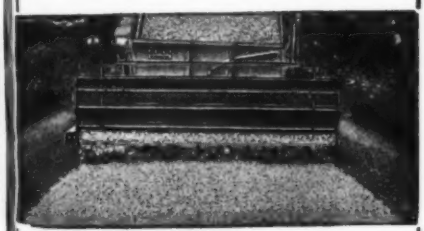
Cuts concrete and cuts labor costs to 2½c per square yard. Applicable to floor work and different types of inside horizontal work.

Very efficient in maintenance work of highways.

Boom folds down and readily trailed by any light truck. Make your compressor treble its output by hooking it to this machine.

Rapid Pavement Breaker Co.
1517 Santa Fe Ave.
Los Angeles 21, Calif.

SPEED, ACCURACY



Where speed, accuracy and economy are factors, BURCH FORCE FEED SPREADERS will distinguish themselves. The many exclusive features including the dual feed control put these machines out ahead in their class. Also, there are no pockets to carry excess material that cannot feed over the roll.

Manufactured by

The BURCH CORPORATION
Crestline, Ohio
Equipment since 1875

BUY WAR BONDS

Automatic Centrifugal Pumps—A new catalog on its line of automatic centrifugal pumps has been issued by Barnes Manufacturing Co., Mansfield, Ohio. An interesting feature is the section, "How to Select the Right Pump for the Job." The catalog includes illustrations of each model, complete details of application, and performance tables. One section is devoted to special construction features of the new line.

▼

Oil Clarifiers—A 16 page catalog has been issued by W. G. B. Oil Clarifier, Inc., Kingston, N. Y., illustrating and describing its line of oil clarifiers for gasoline motors, diesel engines and for large installations. One section deals with how the W. B. G. clarifies work.

Booklets and Pamphlets Received

The American Public Works Association, 1313 E. 60th St., Chicago, has issued to its membership three bulletins which will take the place of the 1945 Public Works Engineers' yearbook:

No. 22, "Financing Local Improvements" ($1.00).

No. 21, "Current Conditions in Refuse Collection" ($.75) and Disposal; Operation of the Orlando Incinerator."

No. 23, "Advance Engineering Design and the Over-All Planning Functions"; A Summary of Discussion Panels on Postwar Public Works" $1.00).

These bulletins summarize papers and remarks given at the 1944 Public Works Congress; available at the price quoted on request to the association headquarters.

▼

"Planning Detroit—1944" 26th annual report of the Detroit City Plan Commission, George F. Emery, Planning Director-Secretary; 34 pp.

▼

Design of Asphalt Pavements for Highway and Airport Engineers.—This 24-p. illustrated pamphlet is a clear, simple, practical discussion; data on design examples load bearing strength of subgrade, highway and airport loads, soil types and how to recognize them, pavement design charts. It is issued as Progress Report No. 1 by the Engineering and Development Committee, Division 3, of the Asphalt Institute, Dwight Bldg., Kansas City, Mo., and Gullard & Wilkins Bldg., Billings, Mont.

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MONEY TIME and LABOR
with
SYNTRON
Gasoline Hammer
PAVING BREAKERS

100% Self-Contained
No Air Compressor and Hose
No Battery Box and Cable
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A "heavy-duty" tool for—

Busting Concrete
Breaking Rock
Cutting Asphalt
Digging Shale
Tamping
and many other jobs

Write for Folder No. 9-44

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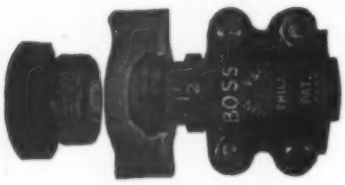
384 Lexington **Homer City, Pa.**

DIXON Couplings
...for Every Road Construction Job!

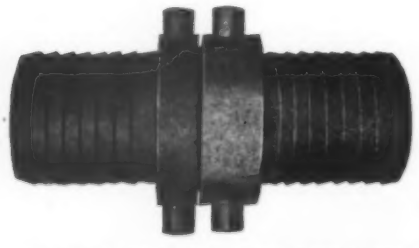


"G J-BOSS" GROUND JOINT STYLE X-34 FEMALE HOSE COUPLING

For high or low pressure steam, air and liquid hose. Washerless, leakproof construction. "BOSS" Offset Interlocking Clamp anchors coupling to hose with powerful full-circumference grip, without pinching. Sizes: ½" to 4", inclusive.

"G. J-BOSS" GROUND JOINT AIR HAMMER COUPLING

Strong, washerless, leakproof. No washers to replace—no danger of blow-offs. Furnished with tight-gripping "BOSS" Interlocking Clamp. Compact Type, Style XLB-61, ½" and ¾". Heavy Type, Style XHB-72, ¾" and 1".



"KING" SHANK COUPLINGS For Suction and Water Hose

Made all malleable iron; malleable iron, brass nut; or all brass. Uniform in quality, threading and dimensions. Shanks have deep, clean corrugations. Sizes: 1¼" to 8", inclusive.

Sold by Manufacturers and Jobbers of Mechanical Rubber Goods

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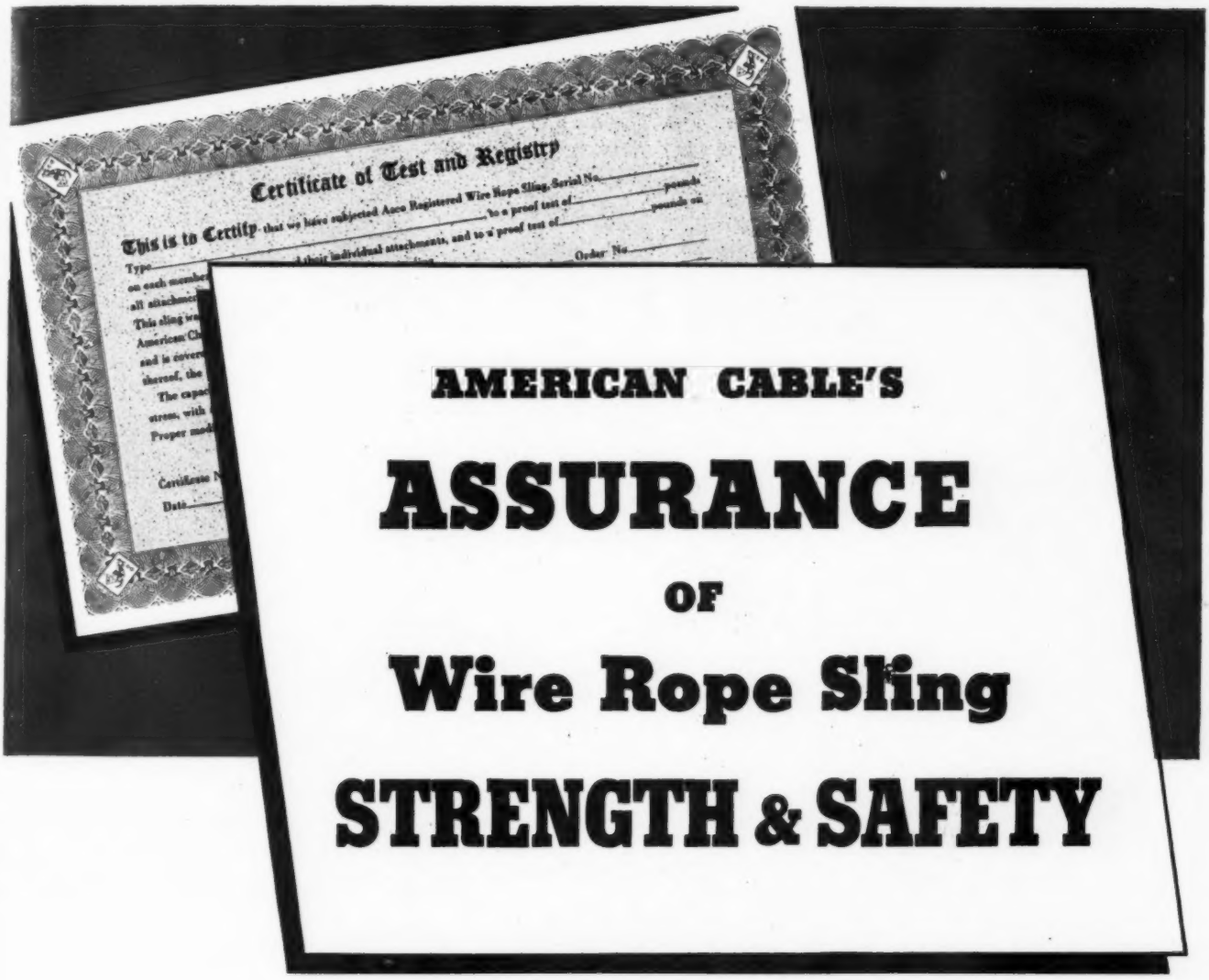

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